PERMIT-TO-INSTALL APPLICATION
OHIO RIVER CLEAN FUELS FACILITY
VILLAGE OF WELLSVILLE, COLUMBIANA AND JEFFERSON COUNTIES, OHIO

SUBMITTED TO:

OHIO ENVIRONMENTAL PROTECTION AGENCY

SUBMITTED BY:

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CEC PROJECT 061-933.0024

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MODULE 11

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1.0 PROCESS DESCRIPTION

Emergency power generation for the site will be provided by a single 16-cylinder diesel-powered 2-MW emergency generator. The generator will be rated to supply approximately 2,650 and 2,330 brake horsepower (bhp) at prime and continuous power respectively. The provided horsepower ratings are generic machine specifications representative of typical industrial emergency generators, as the exact manufacture and model have yet to be specified. A specification sheet detailing this type of generator is included in Attachment 11C. As discussed in the Best Available Control Technology (BACT) Analysis for this Module (see Section 4), it is expected that the engine will be equipped with ignition timing retard with turbocharging and low-temperature aftercooling.

Two nominal 300 bhp diesel-driven fire pump engines will be used to provide fire protection at the facility. The exact manufacture and model have yet to be specified, although specifications for a representative model are provided in Attachment 11C. As discussed in the BACT Analysis for this Module (see Section 4), it is expected that the fire pump engines will be equipped with ignition timing retard with turbocharging and low-temperature aftercooling. The cylinder-specific displacement of the engines will be less than 3 liters.

Both the emergency generator and fire pump engines will burn very low sulfur distillate oil (15 ppmw). Other than plant emergencies, the emergency generator and fire pumps will each operate less than 500 hours annually for routine testing, maintenance, and inspection purposes. Figure 22 is a block flow diagram of the generator and pumps (see Attachment 11A).

2.0 AIR EMISSIONS INVENTORY

Current expectations are for use of a single 2-MW diesel-powered emergency generator. Additionally, two nominal 300-hp diesel fire pumps will be used for fire protection. The emergency generator and fire pumps will each be operated for 500 hours per year or less for maintenance and testing purposes.

2.1 Emergency Generator

One 2-MW generator will be available for emergency situations. Equipment details have yet to be specified. However, it is assumed here that emissions from the generator will meet the emission limits established at 40 CFR 89.112 for non-road compression ignition engines. Those emission limits in combination with emission factors from AP-42 Section 3.4 for Large Stationary Diesel Engines have been utilized to estimate pollutants associated with emergency generator operation (see detailed calculations in Attachment 11B). An average brake-specific fuel consumption (BSFC) of 7,000 Btu/hp-hr is assumed to convert emission factors in lb/MMBtu to lb/hp-hr. The following equation was used to determine the approximate amount of pollutant produced.

$$hp \times \left(\frac{lb}{hp-hr} \right) = \frac{lb}{hr}$$

2.1.1 Criteria Pollutants

The primary pollutants from internal combustion engines are nitrogen oxides (NO_x), sulfur oxides (SO_x), carbon monoxide (CO), particulates (PM), hydrocarbons (HC) and other organic compounds. The emission factors for hydrocarbons, NO_x, CO, and PM were obtained from the emission standards established in 40 CFR 89.112 for non-road compression ignition engines. The standard for HC (reported as non-methane hydrocarbons – NMHC) is combined with NO_x. For purposes of reporting on the OEPA forms, the assumption has been made that 95% of the allowable emissions are NOx and the balance is NMHC.

Emission factors for other pollutants were obtained from AP-42 Table 3.4-1. The presence of sulfur oxides, primarily SO_2, is directly related to the sulfur content of the fuel. The fuel considered for this application is assumed to contain less than 15 ppm sulfur by weight. Emission factors are based on averages across equipment manufacturers and duty cycles and could vary from these levels.

2.1.2 Volatile Organic Compounds & Hazardous Air Pollutants

Emission factors for speciated volatile organic compounds and hazardous air pollutants (HAPs) were determined using emission factors provided in AP-42 Tables 3.4-3 and 3.4-4.

2.2 Fire Pumps

Two 300-hp fire pump engines will be available for emergency situations. These engines are expected to operate 500 hours per year each for routine maintenance and testing. The exact equipment make and model has yet to be specified. However, it is assumed that emissions from the engines will comply with the New Source Performance Standard for Stationary Compression Ignition Internal Combustion Engines (40 CFR 60, Subpart IIII). The generic emission factors for other criteria pollutants and speciated organic compounds were found in AP-42 Tables 3.3-1 and 3.3-2, respectively (emission estimates are provided in Attachment 11B). The following equation was used to determine the approximate amount of pollutant produced.

$$hp \times \left(\frac{lb}{hp - hr} \right) = \frac{lb}{hr}$$

2.2.1 Criteria Pollutants

The emission factors for hydrocarbons, NO_x, CO, and PM were obtained from the emission standards established in 40 CFR 60, Subpart IIII for non-road compression ignition engines (40 CFR 60.4205(c)). The standard for HC (reported as non-methane hydrocarbons – NMHC) is combined with NO_x. For purposes of reporting on the OEPA forms, the assumption has been made that 95% of the allowable emissions are NO_x and the balance is NMHC.

Emission factors for other pollutants were obtained from AP-42, Section 3.3 (Diesel Industrial Engines). The SO_x emission factor was provided as a direct factor and is not dependant on fuel sulfur content. The general characteristic assumptions for the fuel are the same as for the emergency generator.

2.2.2 Volatile Organic Compounds & Hazardous Air Pollutants

Emission factors for speciated volatile organic compounds and hazardous air pollutants (HAPs) were determined using emission factors provided in AP-42 Table 3.3-2.

3.0 SOURCE-SPECIFIC APPLICABLE REGULATIONS

This section presents information concerning applicable state and federal regulations as well as specific exemptions, as appropriate. State regulatory references are to the Ohio Administrative Code (OAC), unless otherwise noted. Source-specific regulations are discussed relative to each permit application module. Facility-wide applicable regulations are addressed in the Application Introduction.

3.1 State Regulations

3.1.1 Control of visible particulate emissions from stationary sources. (3745-17-07)

The emergency generator and pumps are sources of particulate matter. Stationary sources are subject to Chapter 3745-17-07(A)(1)(a) which limits visible particulate emissions to less than 20% opacity as a six-minute average. Chapter 3745-17-07(A)(1)(b) further states that the 20% opacity limit may not be exceeded for more than six consecutive minutes in any sixty minutes and never shall the opacity exceed 60% as a 6-minute average. Except for brief periods during startup, diesel IC engines are expected to achieve these opacity limits.

3.1.2 Restrictions on Particulate Emissions from Industrial Processes (3745-17-11(B)(5))

Any owner or operator of a stationary internal combustion engine shall not cause or permit the particulate emissions from the engine's exhaust to exceed the following:

- 0.310 pound per million Btu of actual heat input for a stationary small internal combustion engine (≤ 600 hp); and
- 0.062 pound per million Btu of actual heat input for a stationary large internal combustion engine (> 600 hp).

AP-42 emission factors indicate that the proposed IC engines will meet these limits. Manufacturer data will be used to confirm these estimates upon selection of equipment vendors.

3.1.3 General Emission Limit Provisions (3745-18-06(F))

No owner or operator of any stationary internal combustion engine shall cause or permit the maximum emission of sulfur dioxide from any source to exceed 0.5 pounds of sulfur dioxide per MMBtu actual heat input.

Sulfur emissions from the proposed IC engines are expected to meet this limit.

3.1.4 Permits to Install New Sources (3745-31)

These emission units are part of a major stationary source. Because the major stationary source is located within an attainment area for all criteria pollutants, according to 3745-31-12(A), each emissions unit is subject to an evaluation of best available control technology (BACT). The BACT analysis for these emission units is provided in Section 4.0. In accordance with 3745-31-05(A)(3), sources are also required to employ best available technology (BAT). Because all sources and pollutants are addressed in the BACT analysis, BAT is assumed to have been achieved for affected emission units.

3.2 Federal Regulations

3.2.1 Standards of Performance for Stationary Compression Ignition Internal Combustion Engines (40 CFR 60, Subpart IIII)

Subpart IIII establishes emission standards for emergency stationary compression ignition (CI) combustion engines. Owners and operators of 2007 model year and later engines with a displacement of less than 30 liters per cylinder that are not fire pump engines, must comply with the emission standards of new nonroad CI engines stated in §60.4202. (Note that the displacement of the emergency generator is estimated at less than 4 liters per cylinder). In accordance with §60.4202, ORCF's non-fire pump engines must comply with the certification emission standards for new nonroad CI engines stated in 40 CFR 89.112 and 40 CFR 89.113, as itemized in Section 3.2.3 below.

Subpart IIII (§60.4205(c)) states that fire pump engines with displacement of less than 30 liters per cylinder must comply with the following emission standards (the displacement of the fire pump engines is estimated at less than 3 liters per cylinder).

Table 3.2.1 Emission Standards for Fire Pump Engines with Displacement Less than 30 Liters per Cylinder

Maximum Engine Power	Model Year	Emission Standard (grams/horsepower-hour)		
		$NMHC + NO_x$ (combined)	CO	PM
$300 \leq HP < 600$	2008 and earlier	7.8	2.6	0.4

Source: Table 4 to Subpart IIII of 40 CFR 60 (40 CFR 60.4200)

As discussed in the BACT analysis for this Module, the fire pump engines will be specified to meet these emission standards.

Subpart IIII also specifies fuel requirements for these stationary CI engines (§60.4207). In accordance with 40 CFR 80.510(b) referenced there, diesel fuel used in these engines must meet the following per gallon standards:

- Sulfur content of 15 ppm maximum; and
- Centane index of 40, minimum; or
- Aromatic content of 35 volume percent, maximum.

3.2.2 National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines (40 CFR 63, Subpart ZZZZ)

Subpart ZZZZ establishes emission and operating limits for hazardous air pollutant (HAP) emissions from stationary reciprocating internal combustion engines (RICE) located at major sources of HAP emissions. Only the initial notification requirements of 40 CFR 63.6645(d) are applicable here. This subpart does not apply to units with rating of ≤ 500 horsepower. While the proposed 2 MW diesel emergency generator exceeds that rating, because it will be used for emergency service, it is exempt from all requirements except for the initial notification. Notification requirements are specified in 40 CFR 63.9(b)(2)(i) through (v).

3.2.3 Control of Emissions from New and In-Use Nonroad Compression-Ignition Engines (40 CFR 89.112 and 89.113)

As discussed above in Section 3.2.1, 40 CFR 89.112 establishes emission standards for new non-fire pump CI engines. Emission standards for engines such as that proposed for ORCF's emergency generator are shown below.

Table 3.2.3 Emission Standards for Emergency Generator Engines

Maximum Engine Power	Model Year	Emission Standard (grams/kW-hour)		
		NMHC + NO_x (combined)	CO	PM
kW > 560	2006 and later	6.4	3.5	0.20

Source: Table 1 to 40 CFR 89.112

As discussed in the BACT analysis for this Module, the emergency generator set will be specified to meet these emission standards.

4.0 BACT ANALYSIS

The emergency generator and fire pumps will be sources of combustion emissions. These engines will burn low sulfur distillate oil and they will be equipped with ignition timing retard with turbocharging and aftercooling to achieve the emission standards established by the New Source Performance Standard (NSPS) for Stationary Compression Ignition Internal Combustion Engines (40 CFR 60, Subpart IIII). Ohio River Clean Fuels, LLC proposes that the NSPS emission limits are equivalent to BACT for the emergency generator and fire pumps.

To ensure completeness of this BACT analysis, reviews of the RBLC database were performed for emergency generators (Process Type 17.110: > 500 hp diesel-fired generators) and fire pumps (Process Type 17.210: ≤ 500 hp diesel-fired engines) to identify prior BACT determinations for the most recent ten years. The search criteria was refined to include only processes that included the terms "emergency" or "fire pump." The following sections summarize the findings and provide BACT determinations. It should be noted that this review did not identify any technically infeasible options. Therefore, the technologies have not been ranked or evaluated by effectiveness as they are all accepted as the proposed BACT.

4.1 Emergency Generator

4.1.1 Available Control Technologies

Carbon Monoxide, Particulate Matter, Volatile Organic Compounds

- Good combustion practices
- Good engine design
- Limited Operation
- Ignition timing retard
- Turbocharger/aftercooler

Sulfur Dioxide

- Good combustion practices
- Limited Operation
- Low-sulfur diesel fuel

4.1.2 Technically Infeasible Options

All of the above-listed technologies are feasible for control of the corresponding criteria pollutant emissions from the operation of the emergency generator.

4.1.3 Technology Ranking

The generator will be designed to incorporate, at a minimum, injection timing retard, turbocharging, and aftercooling. The generator will be operated and maintained in accordance with good combustion practice.

4.1.4 Evaluate Most Effective Controls

The generator will be designed to incorporate ignition timing retard with turbocharging and aftercooling to achieve compliance with the NSPS.

4.1.5 Proposed BACT Limits and Control Options

The specifications for the generator are yet to be determined but will be selected to achieve compliance with the NSPS. The following table presents the emission standards that will not be exceeded:

Table 4.1.5 Maximum Emissions Standards for Generators

Maximum Engine Power	Model Year	Emission Standard (grams/kW-hour)		
		$NMHC + NO_x$ (combined)	CO	PM
kW > 560	2006 and later	6.4	3.5	0.20

Source: Table 1 to 40 CFR 89.112

4.2 Fire Pumps

4.2.1 Available Control Technologies

Carbon Monoxide, Particulate Matter, Volatile Organic Compounds

- Good combustion practices
- Good engine design
- Limited Operation
- Ignition timing retard

Nitrogen Oxide

- Good combustion practices
- Good engine design
- Limited Operation
- Ignition timing retard
- Water spray injection system

Sulfur Dioxide

- Good combustion practices
- Limited Operation
- Low-sulfur diesel fuel

4.2.2 Technically Infeasible Options

All of the above-listed technologies are feasible for control of the corresponding criteria pollutant emissions from the operation of the emergency generator.

4.2.3 Technology Ranking

The fire pumps will be designed to incorporate ignition timing retard with turbocharging and aftercooling. The pumps will be operated and maintained in accordance with good combustion practice.

4.2.4 Evaluate Most Effective Controls

The emergency pumps will be selected/designed to incorporate as many of the above-listed control technologies as needed to achieve compliance with NSPS.

4.2.5 Proposed BACT Limits and Control Options

The specifications for the fire pumps are yet to be determined but will be selected to achieve compliance with the NSPS. The following table presents the engine-specific emission standards that will not be exceeded:

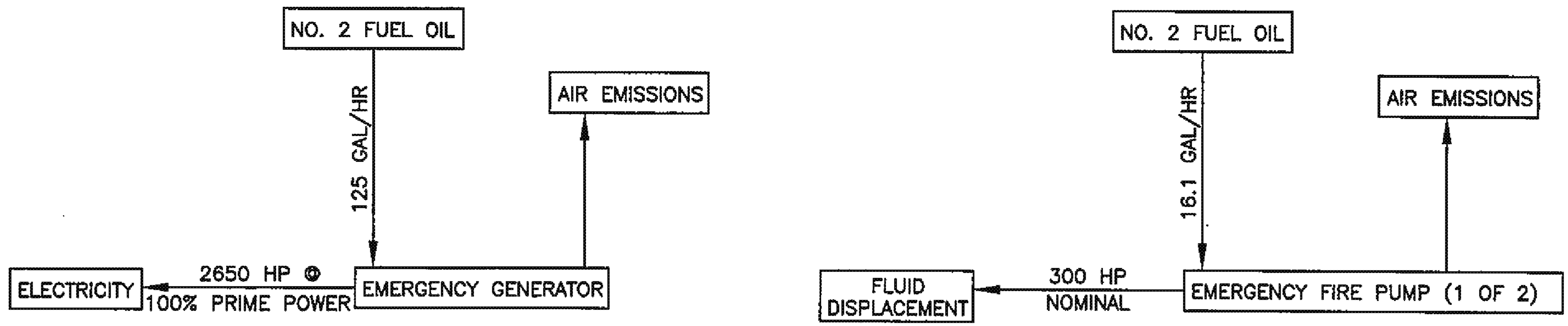
Table 4.2.5 Maximum Engine Specific Emission Standards

Maximum Engine Power	Model Year	Emission Standard (grams/horsepower-hour)		
		$NMHC + NO_x$ (combined)	CO	PM
$300 \leq HP < 600$	2008 and earlier	7.8	2.6	0.4

Source: Table 4 to Subpart IIII of 40 CFR 60 (40 CFR 60.4200)

ATTACHMENT 11A
MODULE 11
FIGURES

\\SVR-PITT\CADD\PROJECTS\2006\061-933\DWG\061933-ENV4-11.DWG {FIG 22} (LCOLAIZZI) - DEC 11, 2007 - 16:59:58



SUBMITTAL & REVISION RECORD

NO	DATE	DESCRIPTION
A	07/27/07	DRAFT SUBMISSION, AS: 061-933-FIGURE-14-BLOCK-FLOW-DIAGRAM.dwg
B	12/17/07	AIR PERMIT APPLICATION

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PROPOSED COAL TO LIQUID FUEL PLANT
COLUMBIANA AND JEFFERSON COUNTY
WELLSVILLE, OHIO

MODULE 11
EMERGENCY GENERATOR AND FIRE PUMPS

APPROVED:	Kevin			PROJECT NO:	061-933.0002	FIGURE NO:	22
DRAWN BY:	JRW/LKC	CHKD BY: DJL	DWG SCALE: N.T.S.	LAST EDIT DATE:	11/26/07		

ATTACHMENT 11B
MODULE 11
SUPPORTING CALCULATIONS

Supporting Calculations

One 2-MW Emergency Generator

Fuel Sulfur Content = 0.0015% 2650 hp 7000 Btu/hp-hr

CAS #	Compound	Federally Listed HAP	Ohio Toxic Air Pollutant	(VOC/POM)	Emission Factors		Short-term Emission	Annual Emission
					(lb/MMBtu)	(lb/hp-hr)	(lb/hr)	(ton/yr)
	NO_x					9.98E-03	26.43	6.61
630-08-0	CO					5.73E-03	15.18	3.80
	SO_x				0.001515	1.21E-05	0.03	0.01
	Total PM (equals PM10)					3.29E-04	0.87	0.22
	NMHC (VOC)					5.25E-04	1.39	0.35
71-43-2	Benzene	Yes	Yes	VOC	7.76E-04	5.43E-06	1.44E-02	3.60E-03
108-88-3	Toluene	Yes	Yes	VOC	2.81E-04	1.97E-06	5.21E-03	1.30E-03
1330-20-7	Xylenes	Yes	Yes	VOC	1.93E-04	1.35E-06	3.58E-03	8.95E-04
50-00-0	Formaldehyde	Yes	Yes	VOC	7.89E-05	5.52E-07	1.46E-03	3.66E-04
75-07--0	Acetaldehyde	Yes	Yes	VOC	2.52E-05	1.76E-07	4.67E-04	1.17E-04
107-02-8	Acrolein	Yes	Yes	VOC	7.88E-06	5.52E-08	1.46E-04	3.65E-05
91-20-3	Naphthalene	Yes	Yes	POM	1.30E-04	9.10E-07	2.41E-03	6.03E-04
208-96-8	Acenaphthylene	Yes	No	POM	9.23E-06	6.46E-08	1.71E-04	4.28E-05
83-32-9	Acenaphthene	Yes	No	POM	4.68E-06	3.28E-08	8.68E-05	2.17E-05
86-73-7	Fluorene	Yes	No	POM	1.28E-05	8.96E-08	2.37E-04	5.94E-05
85-01-8	Phenanthrene	Yes	No	POM	4.08E-05	2.86E-07	7.57E-04	1.89E-04
120-12-7	Anthracene	Yes	No	POM	1.23E-06	8.61E-09	2.28E-05	5.70E-06
206-44-0	Fluoranthene	Yes	No	POM	4.03E-06	2.82E-08	7.48E-05	1.87E-05
129-00-0	Pyrene	Yes	No	POM	3.71E-06	2.60E-08	6.88E-05	1.72E-05
56-55-3	Benzo(a)anthracene	Yes	No	POM	6.22E-07	4.35E-09	1.15E-05	2.88E-06
218-01-9	Chrysene	Yes	No	POM	1.53E-06	1.07E-08	2.84E-05	7.10E-06
205-99-2	Benzo(b)fluoranthene	Yes	No	POM	1.11E-06	7.77E-09	2.06E-05	5.15E-06
207-08-9	Benzo(k)fluoranthene	Yes	No	POM	2.18E-07	1.53E-09	4.04E-06	1.01E-06
50-32-8	Benzo(a)pyrene	Yes	No	POM	2.57E-07	1.80E-09	4.77E-06	1.19E-06
193-39-5	Indeno(1,2,3-cd)pyrene	Yes	No	POM	4.14E-07	2.90E-09	7.68E-06	1.92E-06
53-70-3	Dibenz(a,h)anthracene	Yes	No	POM	3.46E-07	2.42E-09	6.42E-06	1.60E-06
191-24-2	Benzo(g,h,i)perylene	Yes	No	POM	5.56E-07	3.89E-09	1.03E-05	2.58E-06
				TOTAL POM:	**2.12E-04**	**1.48E-06**	**3.92E-03**	**9.81E-04**
				TOTAL HAP:	**1.57E-03**	**1.10E-05**	**0.03**	**0.007**

Average brake-specific fuel consumption (BSFC) = 7,000 Btu/hp-hr
Annual emissions are based on 500 hr/yr operation.

The 40 CFR 89.112, limit for NMHC+NO_x from emergency non-fire pump engines is: 1.05E-02 lb/hp-hr. For purposes of partitioning the total across NMHC and NO_x, the assumption is that 5% of the total is VOC with the balance NO_x.
The emission factor for SO_x is from AP-42 Table 3.4.1 and HAP emission factors are from Table 3.4.3 and 3.4.4.

Supporting Calculations

One 300-hp Emergency Fire Pump Engine

					300 hp		7000 Btu/hp-hr	
CAS #	**Compound**	**Federally Listed HAP**	**Ohio Toxic Air Pollutant**	**VOC/PAH**	**Emission Factors**		**Shot-term Emission**	**Annual Emission**
					(lb/MMBtu)	**(lb/hp-hr)**	**(lb/hr)**	**(ton/yr)**
	NO_x					1.63E-02	4.90	1.23
630-08-0	CO					5.73E-03	1.72	0.43
	SO_x				0.29	2.05E-03	0.62	0.15
	Total PM (equals PM10)					8.82E-04	0.26	0.07
	NMHC (VOC)					8.60E-04	0.26	0.06
71-43-2	Benzene	Yes	Yes	VOC	9.33E-04	6.53E-06	1.96E-03	4.90E-04
108-88-3	Toluene	Yes	Yes	VOC	4.09E-04	2.86E-06	8.59E-04	2.15E-04
1330-20-7	Xylenes	Yes	Yes	VOC	2.85E-04	2.00E-06	5.99E-04	1.50E-04
106-99-0	1,3-Butadiene	Yes	Yes	VOC	3.91E-05	2.74E-07	8.21E-05	2.05E-05
50-00-0	Formaldehyde	Yes	Yes	VOC	1.18E-03	8.26E-06	2.48E-03	6.20E-04
75-07--0	Acetaldehyde	Yes	Yes	VOC	7.67E-04	5.37E-06	1.61E-03	4.03E-04
107-02-8	Acrolein	Yes	Yes	VOC	9.25E-05	6.48E-07	1.94E-04	4.86E-05
91-20-3	Naphthalene	Yes	Yes	POM	8.48E-05	5.94E-07	1.78E-04	4.45E-05
208-96-8	Acenaphthylene	Yes	No	POM	5.06E-06	3.54E-08	1.06E-05	2.66E-06
83-32-9	Acenaphthene	Yes	No	POM	1.42E-06	9.94E-09	2.98E-06	7.46E-07
86-73-7	Fluorene	Yes	No	POM	2.92E-05	2.04E-07	6.13E-05	1.53E-05
85-01-8	Phenanthrene	Yes	No	POM	2.94E-05	2.06E-07	6.17E-05	1.54E-05
120-12-7	Anthracene	Yes	No	POM	1.87E-06	1.31E-08	3.93E-06	9.82E-07
206-44-0	Fluoranthene	Yes	No	POM	7.61E-06	5.33E-08	1.60E-05	4.00E-06
129-00-0	Pyrene	Yes	No	POM	4.78E-06	3.35E-08	1.00E-05	2.51E-06
56-55-3	Benzo(a)anthracene	Yes	No	POM	1.68E-06	1.18E-08	3.53E-06	8.82E-07
218-01-9	Chrysene	Yes	No	POM	3.53E-07	2.47E-09	7.41E-07	1.85E-07
205-99-2	Benzo(b)fluoranthene	Yes	No	POM	9.91E-08	6.94E-10	2.08E-07	5.20E-08
207-08-9	Benzo(k)fluoranthene	Yes	No	POM	1.55E-07	1.09E-09	3.26E-07	8.14E-08
50-32-8	Benzo(a)pyrene	Yes	No	POM	1.88E-07	1.32E-09	3.95E-07	9.87E-08
193-39-5	Indeno(1,2,3-cd)pyrene	Yes	No	POM	3.75E-07	2.63E-09	7.88E-07	1.97E-07
53-70-3	Dibenz(a,h)anthracene	Yes	No	POM	5.83E-07	4.08E-09	1.22E-06	3.06E-07
191-24-2	Benzo(g,h,i)perylene	Yes	No	POM	4.89E-07	3.42E-09	1.03E-06	2.57E-07
				TOTAL POM:	**1.68E-04**	**1.18E-06**	**3.53E-04**	**1.76E-05**
				TOTAL HAP:	**3.87E-03**	**2.71E-05**	**8.13E-03**	**2.03E-03**

Totals for 2 Fire Pump Engines

Pollutant	lb/hr	tpy
NO_x	9.80	2.45
CO	3.44	0.86
SO_x	1.23	0.31
PM_{10}	0.53	0.13
VOC	0.52	0.13
HAP	0.02	0.004

Annual emissions are based on 500 hr/yr operation.

Emission factors for NO_x, NMHC, CO, and PM10 were obtained from the NSPS standards for Stationary Compression Ignition Internal Combustion Engines (40 CFR 60, Subpart IIII). The emission factor for SO_x is from AP-42, Table 3.3.1

The 40 CFR 60.4205, Table 4 limit for NMHC+NOx from emergency fire pumps is: 1.72E-02 lb/hp-hr. For purposes of partitioning the total across NMHC and NO_x, the assumption is that 5% of the total is POC with the balance NO_x.

Emission factors for HAPs are from AP-42 3.3.2

ATTACHMENT 11C
MODULE 11
DOCUMENTATION

LIST OF REFERENCES

- U.S. EPA, AP-42 Section 3.4 – *Large Stationary Diesel Engines*, October 1996.
- U.S. EPA, AP-42 Section 3.3 – *Diesel Industrial Engines*, October 1996.
- U.S. EPA, RACT/BACT/LAER Clearinghouse (RBLC);
  website: http://cfpub.epa.gov/RBLC

CUMMINS ENGINE COMPANY, INC Columbus, Indiana 47201 ENGINE PERFORMANCE CURVE	Basic Engine Model: QSK60-G6 NON-ROAD 1	Curve Number: FR-6364	*G-DRIVE* QSK 1
	Engine Critical Parts List: CPL: 2920	Date: 1Feb01	

Displacement : 60.2 liter (3673 in^3)	Bore : 159 mm (6.25 in.) Stroke : 190 mm (7.48 in.)
No. of Cylinders : 16	Aspiration : Turbocharged and Low Temperature Aftercooled (2 pump / 2 loop)

•• PRELIMINARY ••

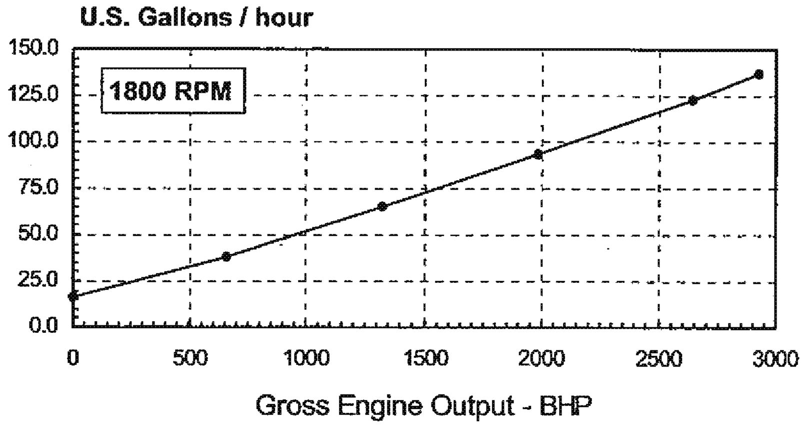
Engine Speed	Standby Power		Prime Power		Continuous Power	
RPM	kWm	BHP	kWm	BHP	kWm	BHP
1800	2180	2922	1975	2647	1740	2332

Emissions Certification

This engine complies with certain emissions requirements established by US EPA/CARB.
See Exhaust Emissions Data Sheet for conformance specifics.

Engine Performance Data @ 1800 RPM

OUTPUT POWER			FUEL CONSUMPTION			
%	kWm	BHP	kg/ kWm·h	lb/ BHP·h	liter/ hour	U.S. Gal/ hour
STANDBY POWER						
100	2180	2922	0.203	0.334	521	137.5
PRIME POWER						
100	1975	2647	0.201	0.330	466	123.1
75	1481	1986	0.204	0.336	356	94.0
50	988	1324	0.213	0.350	247	65.3
25	494	662	0.249	0.409	144	38.1
CONTINUOUS POWER						
100	1740	2332	0.201	0.331	412	108.7



CONVERSIONS: (litres = U.S. Gal x 3.785) (Engine kWm = BHP x 0.746) (U.S. Gal = litres x 0.2642) (Engine BHP = Engine kWm x 1.34)

These guidelines have been formulated to ensure proper application of generator drive engines in A.C. generator set installations. Generator drive engines are not designed for and shall not be used in variable speed D.C. generator set applications.

STANDBY POWER RATING
Applicable for supplying emergency power for the duration of the utility power outage. No overload capability is available for this rating. Under no condition is an engine allowed to operate in parallel with the public utility at the Standby Power rating. This rating should be applied where reliable utility power is available. A Standby rated engine should be sized for a maximum of an 80% average load factor and 200 hours of operation per year. This includes less than 25 hours per year at the Standby Power rating. Standby ratings should never be applied except in true emergency power outages. Negotiated power outages contracted with a utility company are not considered an emergency.

PRIME POWER RATING
Applicable for supplying electric power in lieu of commercially purchased power. Prime Power applications must be in the form of one of the following two categories:

UNLIMITED TIME RUNNING PRIME POWER

Prime Power is available for an unlimited number of hours per year in a variable load application. Variable load should not exceed a 70% average of the Prime Power rating during any operating period of 250 hours. The total operating time at 100% Prime Power shall not exceed 500 hours per year. A 10% overload capability is available for a period of 1 hour within a 12-hour period of operation. Total operating time at the 10% overload power shall not exceed 25 hours per year.

LIMITED TIME RUNNING PRIME POWER

Limited Time Prime Power is available for a limited number of hours in a non-variable load application. It is intended for use in situations where power outages are contracted, such as in utility power curtailment. Engines may be operated in parallel to the public utility up to 750 hours per year at power levels never to exceed the Prime Power rating. The customer should be aware, however, that the life of any engine will be reduced by this constant high load operation. Any operation exceeding 750 hours per year at the Prime Power rating should use the Continuous Power rating.

CONTINUOUS POWER RATING
Applicable for supplying utility power at a constant 100% load for an unlimited number of hours per year. No overload capability is available for this rating.

Data shown above represent gross engine performance capabilities obtained and corrected in accordance with ISO-3046 conditions of 100 kPa (29.53 in Hg) barometric pressure [110 m (361 ft) altitude], 25 °C (77 °F) air inlet temperature, and relative humidity of 30% with No. 2 diesel or a fuel corresponding to ASTM D2.

See reverse side for application rating guidelines.

The fuel consumption data is based on No. 2 diesel fuel weight at 0.85 kg/liter (7.1 lbs/U.S. gal).

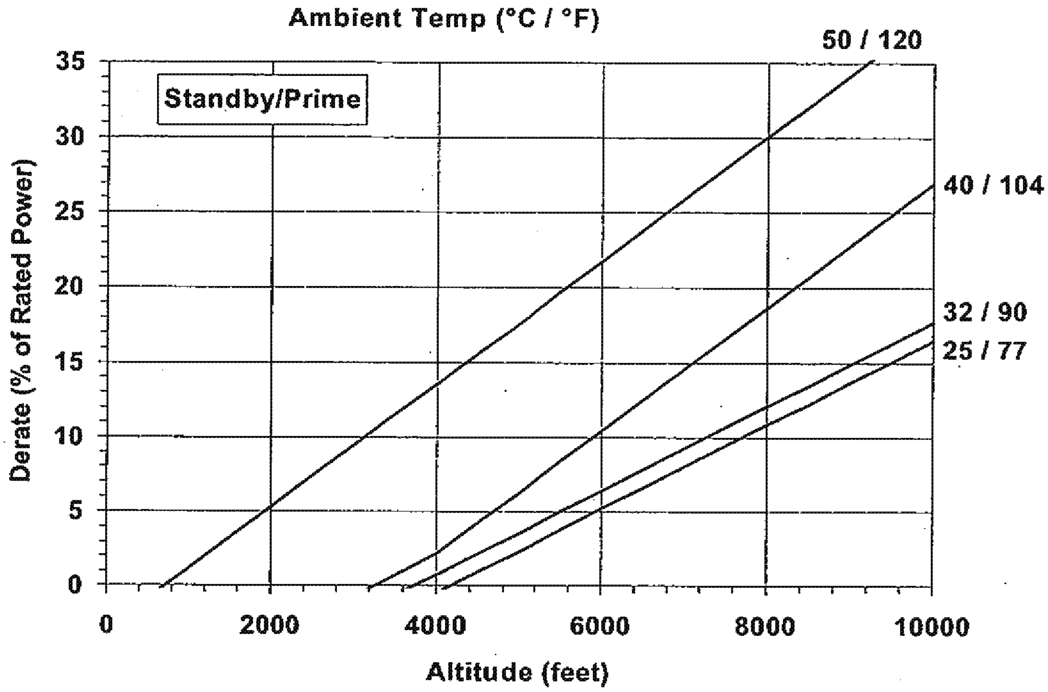
Power output curves are based on the engine operating with fuel system, water pump and lubricating oil pump; not included are battery charging alternator, fan, optional equipment and driven components.

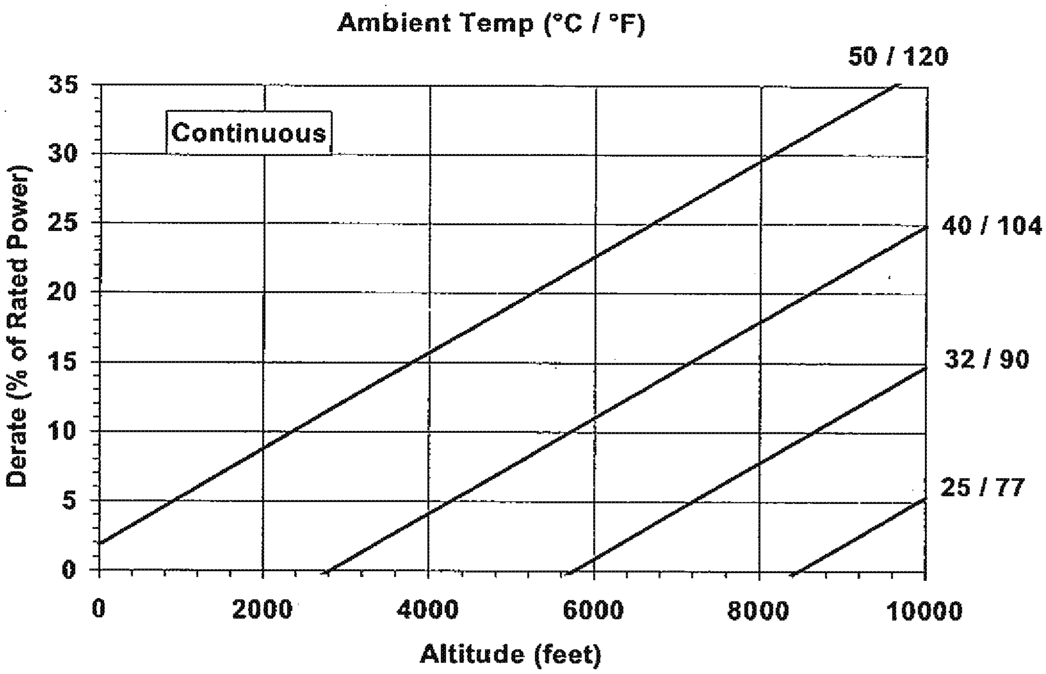
D.K. Trueblood

TECHNICAL DATA DEPT. **CERTIFIED WITHIN 5%** **CHIEF ENGINEER**

QSK60-G6 Derate Curves @ 1800 RPM
•• PRELIMINARY ••

CURVE NO: FR-6364
DATE: 1Feb01





Reference Standards:

BS-5514 and DIN-6271 standards are based on ISO-3046.

Operation At Elevated Altitude and Temperature:

For sustained operation above these conditions, derate by an additional 4.3% per 300 m (1000 ft), and 12% per 10°C (18°F).

Note: Derates shown are based on 15 in H_20 air intake restriction and 2 in Hg exhaust back pressure.

•• PRELIMINARY •• Cummins Engine Company, Inc.
Engine Data Sheet

ENGINE MODEL : QSK60-G6 CONFIGURATION NUMBER : D593002GX03

DATA SHEET : DS-6364
DATE : 1Feb01
PERFORMANCE CURVE : FR-6364

INSTALLATION DIAGRAM
• Fan to Flywheel : 3170292

CPL NUMBER
• Engine Critical Parts List : 2920

GENERAL ENGINE DATA

Type		4-Cycle; 60° Vee; 16-Cylinder Diesel
Aspiration		Turbocharged and Low Temperature Aftercooled (2 Pump / 2 Loop)
Bore x Stroke	— mm x mm (in x in)	159 x 190 (6.25 x 7.48)
Displacement	— liter (in^3)	60.2 (3673)
Compression Ratio		14.5 : 1

Dry Weight			
Fan to Flywheel Engine (with SAE 0 Flywheel and Flywheel Housing)	— kg (lb)	7185	(15835)
Wet Weight			
Fan to Flywheel Engine	— kg (lb)	7540	(16620)
Moment of Inertia of Rotating Components			
• with FW 6043 Flywheel (SAE 0)	— kg • m^2 (lb_m • ft^2)	15.77	(375.5)
• with FW 6037 Flywheel (SAE 00)	— kg • m^2 (lb_m • ft^2)	26.23	(622.4)
Center of Gravity from Front Face of Block	— mm (in)	1001	(39.4)
Center of Gravity Above Crankshaft Centerline	— mm (in)	219	(8.6)
Maximum Static Loading at Rear Main Bearing	— kg (lb)	TBD	TBD

ENGINE MOUNTING

Maximum Bending Moment at Rear Face of Block	— N • m (lb • ft)	10350	(7634)

EXHAUST SYSTEM

Maximum Back Pressure at 1800 RPM (Standby Power)	— mm Hg (in Hg)	51	(2)

AIR INDUCTION SYSTEM

Maximum Intake Air Restriction			
• with Dirty Filter Element	— kPa (in H_2O)	6.2	(25)
• with Clean Filter Element	— kPa (in H_2O)	3.7	(15)

COOLING SYSTEM (Separate Circuit Aftercooling Required)

Coolant Capacity — Engine	— liter (US gal)	159	(42)
— Aftercoolers	— liter (US gal)	34	(9)
Maximum Coolant Friction Head External to Engine — 1800 rpm	— kPa (psi)	69	(10)
Maximum Static Head of Coolant Above Engine Crank Centerline	— m (ft)	18.3	(60)
Thermostat Modulating Range — High Flow	°C (°F)	82 - 93	(180 - 200)
— Low Flow	°C (°F)	46 - 57	(115 - 135)
Minimum Pressure Cap (For Cooling Systems with less than 2 m [6 ft.] Static Head)	— kPa (psi)	76	(11)
Maximum Top Tank Temperature for Standby / Prime Power	— °C (°F)	104 / 100	(220 / 212)

Aftercooler Circuit Requirements:

Maximum Coolant Friction Head External to Engine — 1800 rpm	— kPa (psi)	48	(7)
Maximum Inlet Water Temperature to Aftercooler @ 77 °F Ambient	— °C (°F)	49	(120)
Maximum Inlet Water Temperature to Aftercooler	— °C (°F)	65	(150)

LUBRICATION SYSTEM

Oil Pressure @ Idle Speed	— kPa (psi)	138	(20)
@ Governed Speed	— kPa (psi)	345-483	(50-70)
Maximum Oil Temperature	— °C (°F)	121	(250)
Oil Capacity with OP6073 Oil Pan: Low - High	— liter (US gal)	231-261	(61-69)
Total System Capacity (with Combo Filter)	— liter (US gal)	280	(74)

FUEL SYSTEM

Type Injection System		Cummins HPI-PT	
Maximum Restriction at PT Fuel Injection Pump — with Clean Fuel Filter	— mm Hg (in Hg)	102	(4.0)
— with Dirty Fuel Filter	— mm Hg (in Hg)	203	(8.0)
Maximum Restriction of Engine Fuel Filter Head and Clean Fuel Filter	— mm Hg (in Hg)	38	(1.5)
Maximum Allowable Head on Injector Return Line (Consisting of Friction Head and Static Head)	— mm Hg (in Hg)	229	(9.0)
Maximum Fuel Inlet Temperature	—°C (°F)	70	(160)
Maximum Fuel Flow to Injection Pump	— liter / hr (US gph)	1685	(445)
Maximum Drain Flow	— liter / hr (US gph)	1535	(405)

ELECTRICAL SYSTEM

Cranking Motor (Heavy Duty, Positive Engagement)	— volt	24
Maximum Allowable Resistance of Cranking Circuit	— ohm	.002
Minimum Recommended Battery Capacity		
• Cold Soak @ 10 °C (50 °F) and Above	— 0°F CCA	1800
• Cold Soak @ 0 °C to 10 °C (32 °F to 50 °F)	— 0°F CCA	1800
• Cold Soak @ -18 °C to 0 °C (0 °F to 32 °F)	— 0°F CCA	1800

COLD START CAPABILITY

Minimum Ambient Temperature for Cold Start with ________ watt Coolant Heater to Rated Speed	— °C (°F)	TBD	(TBD)
Minimum Ambient Temperature for Unaided Cold Start to Idle Speed	— °C (°F)	TBD	(TBD)
Minimum Ambient Temperature for NFPA 110 Cold Start (90° F Minimum Coolant Temperature)	— °C (°F)	10	(50)

PERFORMANCE DATA

All data is based on:
- Engine operating with fuel system, water pump, lubricating oil pump, air cleaner and exhaust silencer; not included are battery charging alternator, fan, and optional driven components.
- Engine operating with fuel corresponding to grade No. 2-D per ASTM D975.
- ISO 3046, Part 1, Standard Reference Conditions of:

Barometric Pressure	: 100 kPa (29.53 in Hg)	Air Temperature	: 25 °C (77 °F)
Altitude	: 110 m (361 ft)	Relative Humidity	: 30%

Steady State Stability Band at any Constant Load	— %	+/- 0.25
Estimated Free Field Sound Pressure Level of a Typical Generator Set; Excludes Exhaust Noise; at Rated Load and 7.5 m (24.6 ft); 1800 rpm / 1500 rpm	— dBA	96.5 (est.)
Exhaust Noise at 1 m Horizontally from Centerline of Exhaust Pipe Outlet Upwards at 45°	— dBA	110 (est.)

		STANDBY POWER 60 hz	STANDBY POWER 50 hz	PRIME POWER 60 hz	PRIME POWER 50 hz
Governed Engine Speed	— rpm	1800	Not Applicable for 1500 RPM Operation	1800	Not Applicable for 1500 RPM Operation
Engine Idle Speed	— rpm	700 - 900		700 - 900	
Gross Engine Power Output	— kW_m (BHP)	2180 (2922)		1975 (2647)	
Brake Mean Effective Pressure	— kPa (psi)	2420 (351)		2185 (317)	
Piston Speed	— m / s (ft / min)	11.4 (2243)		11.4 (2243)	
Friction Horsepower	— kW_m (HP)	207 (277)		207 (277)	
Engine Jacket Water Flow at Stated Friction Head External to Engine:					
• 4 psi Friction Head	— liter / s (US gpm)	32 (510)		32 (510)	
• Maximum Friction Head	— liter / s (US gpm)	30 (480)		30 (480)	
Engine Data					
Intake Air Flow	— liter / s (cfm)	2900 (6150)		2685 (5690)	
Exhaust Gas Temperature	— °C (°F)	475 (890)		460 (860)	
Exhaust Gas Flow	— liter / s (cfm)	7320 (15500)		6650 (14070)	
Air to Fuel Ratio	— air : fuel	27.1:1		28.0:1	
Radiated Heat to Ambient	— kW_m (BTU / min)	210 (11910)		190 (10660)	
Heat Rejection to Engine Jacket Radiator	— kW_m (BTU / min)	620 (35150)		555 (31410)	
Heat Rejection to Exhaust	— kW_m (BTU / min)	1590 (90340)		1415 (80510)	
Heat Rejection to Fuel*	kW_m (BTU / min)	35 (2000)		35 (2000)	
Engine Aftercooler Data					
Heat Rejection to Coolant	— kW_m (BTU / min)	625 (35380)		540 (30600)	
Aftercooler Water Flow at Stated Friction Head External to Engine:					
• 2 psi Friction Head	— liter / s (US gpm)	8.5 (135)		8.5 (135)	
• Maximum Friction Head	— liter / s (US gpm)	8.4 (132.5)		8.4 (132.5)	

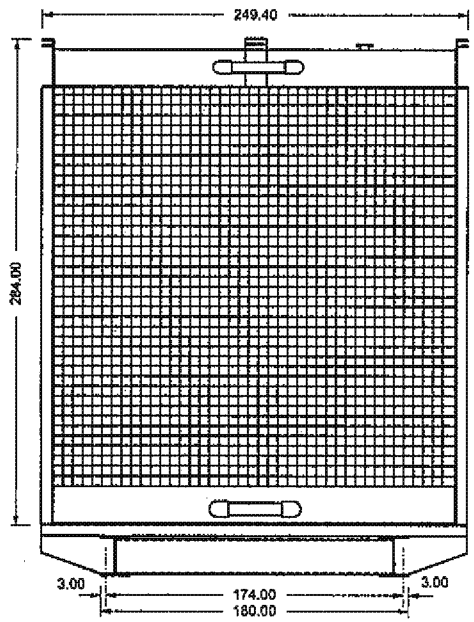
* This is the maximum heat rejection to fuel, which is at low load.

N.A. - Data is Not Available
N/A - Not Applicable to this Engine
TBD - To Be Determined

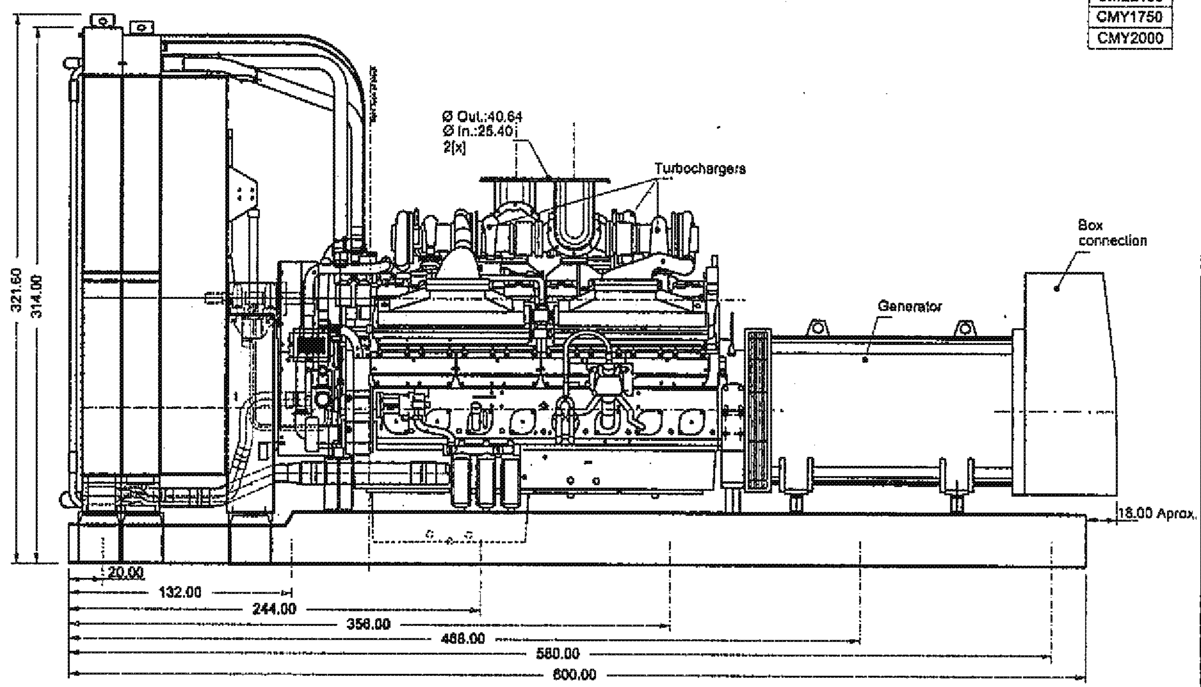
•• PRELIMINARY ••

ENGINE MODEL : QSK60-G6
DATA SHEET : DS-6364
DATE : 1Feb01
CURVE NO. : FR-6364

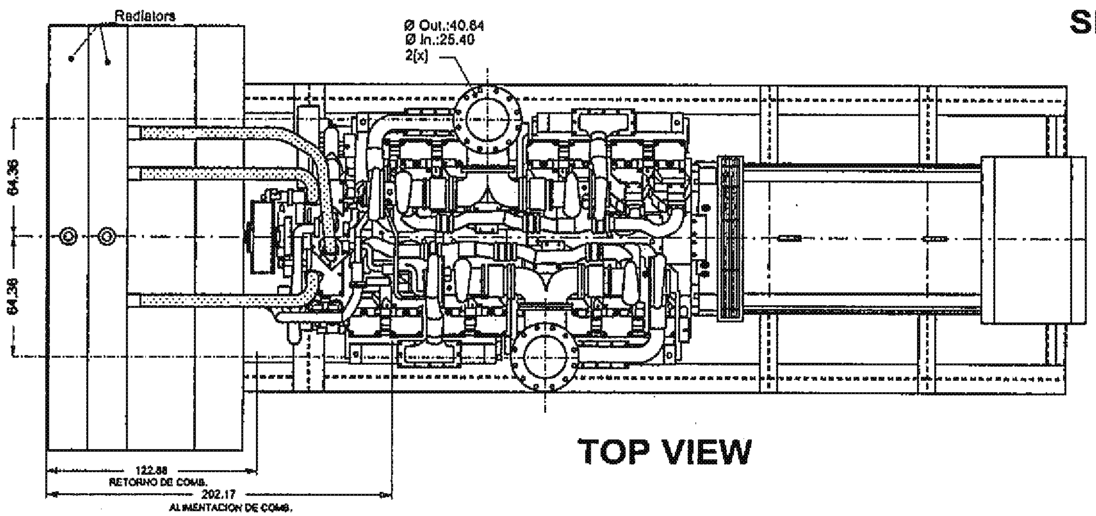
MODELS
CME1985
CME2150
CMY1750
CMY2000



FRONT VIEW



SIDE VIEW



TOP VIEW

DESCRIPTION	
RADIATOR :	BEARWARD 56386-01
ENGINE :	QSK60 G3/G4/G5/G6
AIR FILTER :	- 4[X]
TOTAL WEIGHT :	14,624.0 KGS.
# SPRINGS (AVMS) :	12. AMORT.

Notes:

1.- The genset dimensions are the same by family model, there could be only differences on the allernator lenght see specific general arregement drawing of certain model.
2.- Triton power keeps the right to modify the information without prior notice.

ITEM	DESCRIPTION	CERTIFICATED	DATE

REVISWA

CUSTOMER:

DRAW:	ROGELIO GONZALEZ C.
DESIGN:	ROGELIO GONZALEZ C.
REVISED:	ING. FRANCISCO HARO M.
REVISED:	
CERTIFICATED:	ING. FRANCISCO HARO M.
MARKS: CM	SCALE: S/E

CUMMINS ENGINE
QSK60G3/G4/G5/G6
MARATHON ALTERNATOR

PURCHASE ORDER:	CODE:	DRW:
DATE: MAY 12 2004	CME/Y-18	OF:

SPECIFICATIONS: 60-2000KW - DIESEL GENERATOR SET - LIQUID COOLED - FOUR CYCLE - CUMMINS ENGINES - 2001 RATINGS

RATINGS (Standby) *		60KW	100KW	250KW	400KW	500KW	750KW	1000KW	1250KW	1500KW	1750KW	2000KW	
Engine Model		4BT3.9G-4	6BT5.9G-6	LTA10G-1	NTA855-G5	KTA19-G4	QST30-G1	QST30-G5	KTA50-G3	KTTA50-G2	QSK60-G6	QSK60-G6	
Cylinders		4	6	6	6	6	V-12	V-12	V-16	V-16	V-16	V-16	
Displacement	cu in/l	238/3.9	360/5.9	610/10	855/14	1150/18.8	1860/30.5	1860/30.5	3067/50.3	3067/50.3	3673-60.2	3673/60.2	
Aspiration		T	T	TA	TA	TA		TA	TA	TTA	TA		
Horsepower @ 1800 RPM		102	166	380	605	755	1135	1490	1850	2220	2922	2922	
BMEP (1800 rpm Standby)	psi	171	191	269	311	280	269	352	262	313	307	351	
Fuel Consumption (Full Load)	gal/hr	12.6	7.5	1618	29.1	35.2	54.7	68	80.8	95	117	137	
Oil Sump Capacity	qt	11.5	17.3		40	48	40.7	40.7	177	177	296	296	
Engine & Radiator Capacity	gal	5.5	615	13.0	15.3	24	53	170	102	102	130	151	
Water Pump Flow	gal/min	45	38	97	130	196	235	270	535	535	360	510	
Aftercooler Circuit Flow	gal/min							85			360	135	
Heat Rejection to Coolant	BTUM	2450	4315	8360	15125	16350	27860	20880	46250	55500	30065	36300	
Heat Rejection to Aftercooler Circuit	BTUM							15420			28960	35500	
Radiator Airflow	cfm	4900	5300	13320	19700	27200	34000	58014	68000	68000	61000	74908	
Exhaust Temp	°F	925	1060	965	995	939	895	975	987	870	850	850	
Exhaust Gas Flow	cfm	505	800	1825	3780	3945	6160	7775	9620	10505	13040	15150	
Genset Radiated Heat	BTUM	1070	1646	3240	5580	6100	9590	7460	14040	16930	14200	20312	
Exhaust Outlet Size	in	3"	3"	4"	6"	8"	2 x 8"	2 x 8"	2 x 6"	16"	2 x 12"	2 x 12"	
Electrical System	volts	12	12/24	12/24	24	24	24	24	24	24	24	24	

DIMENSIONS AND WEIGHT **

Length	in	76	92	134	124	160	172	180	222	230	230	240	
Width	in	30	30	50	50	60	69	78	75	77	98	98	
Height	in	47	48	64	70	78	92	103	99	104	120	120	
Weight	lb	1720	2650	6090	7480	10300	17600	16202	23210	24000	32000	32600	

* Contact factory for derating information.

** Dimensions listed are for reference purposes only. Certified drawings are provided on placement of order.

NOTE: Maximum radiator discharge back pressure = 0.5 inches or 12.7 mm. water column. Materials and specifications may change without notification.

ALTURDYNE
660 Steele Street El Cajon, CA 92020

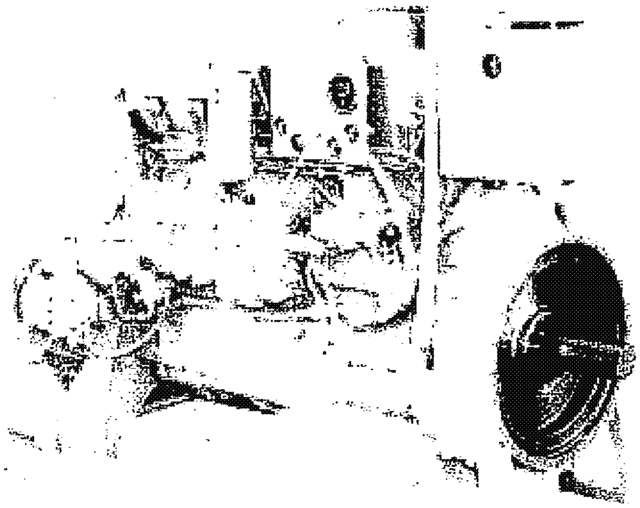
Tel: 619/440-5531 Fax: 619/442-0481
Email: info@alturdyne.com

CATERPILLAR®

Fire Pump Engine

3406B

325-482 hp
242-360 kW



SPECIFICATIONS

In-line 6, 4-Stroke-Cycle Diesel
Turbocharged & Turbocharged-Aftercooled

Bore—in (mm)	5.4 (137)
Stroke—in (mm)	6.5 (165)
Displacement—cu in (L)	893 (14.6)
Rotation (from flywheel end)	Counterclockwise
Capacity for Liquids—U.S. gal (L)	
Cooling System* (T)	27.5 (104.1)
(TA)	29.2 (110.5)
Lube Oil System (refill)	9.0 (34.1)
Weight, Net Dry (approx)—lb (kg)	
Turbocharged	2,960 (1342)
Turbocharged-Aftercooled	3,240 (1469)

* Engine only. Capacity will vary with radiator size and use of cab heater.

STANDARD EQUIPMENT

Air cleaner, single-stage, dry
Alternator, charging, 24 Volt
Breather, crankcase
Cooler, lubricating oil, right side
Elbow, exhaust, dry, 6-inch
Filters
  fuel, left side
  lubricating oil, right side
  primary fuel
Flywheel
Flywheel housing, SAE No. 1
Flywheel stub shaft
Governor control, vernier
Governor, hydra-mechanical
Heat exchanger (installed)
Heater, jacket water (120/240 Volts)
Instrument panel, left side
  ammeter gauge, fuel pressure gauge, lubricating oil pressure gauge, tachometer, water temperature gauge
Lifting eyes
Manifolds, dry shielded
Oil filler and dipstick on right side
Oil pan, rear sump
Paint, red
Pumps
  fuel priming; fuel transfer; jacket water, gear-driven, centrifugal, right side
SAE standard rotation
Service meter, electric
Stop-start system, automatic
  (compatible with NFPA 20 requirements — energizable from either of two battery sources and capable of manual starter actuation)
Supports
Tank, expansion
Thermostats and housing
Torsional vibration damper
Turbocharger, dry shielded
Variable timing, automatic

CAT® DIESEL FIRE PUMP ENGINES

Factory designed—assembled—tested and delivered in a package that meets NFPA-20 regulations and more—supported 100% by your Caterpillar dealers.

FACTORY RUN-IN

All Cat® fire pump diesels are dynomometer tested at the factory to make sure they meet the certified rating standards. Your Caterpillar dealer can provide on-site inspection and training or instruction.

RELIABLE STARTING

Cat® fuel injection systems feature individual injection pumps for each cylinder and injector capsules with clog-resistant orifices. Injection system, along with a solenoid energized to shut down, assures quick, easy starting in case of emergency.

Factory Mutual System Approved

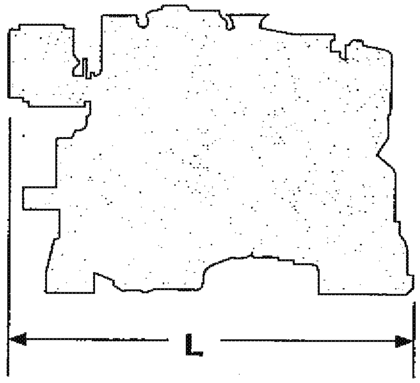
UL LISTED

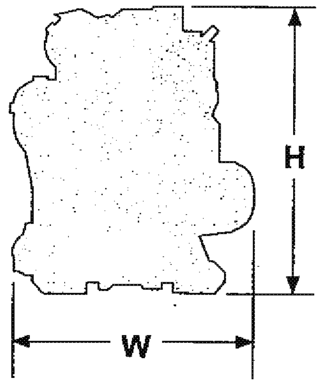
ULC

CATERPILLAR ENGINE FACILITIES ISO 9001 CERTIFIED

CATERPILLAR® 3406B FIRE PUMP ENGINE – 325-482 hp 242-360 kW

DIMENSIONS





LENGTH	in	mm
Turbocharged	76.3	(1939)
Turbocharged-Aftercooled	76.3	(1939)

WIDTH	in	mm
Turbocharged	46.3	(1175)
Turbocharged-Aftercooled	46.3	(1175)

HEIGHT	in	mm
Turbocharged	51.6	(1311)
Turbocharged-Aftercooled	51.8	(1316)

FUEL CONSUMPTION gal/h (liter/h)

	Turbocharged	Turbocharged-Aftercooled
1460 rpm	16.1 (60.9)	–
1750 rpm	18.3 (69.4)	22.3 (84.6)
1900 rpm	18.6 (70.5)	22.4 (84.9)
2100 rpm	18.6 (70.5)	23.6 (89.3)
2300 rpm	17.8 (67.3)	22.5 (85.2)

POWER RATING hp (kW)

1460 rpm	325 (242)	–
1750 rpm	370 (276)	460 (343)
1900 rpm	375 (280)	460 (343)
2100 rpm	375 (280)	482 (360)
2300 rpm	350 (261)	455 (339)

RATING CONDITIONS AND DEFINITIONS

Rating conditions are 300 ft (91.4 m) above sea level 29.61 in Hg or (0.7521 m Hg) at 77° F (25° C). Deductions in horsepower of 3% for each 1,000 ft (305 m) above 300 ft (91.4 m) and 1% for each 10° F (5.6° C) increase in ambient temperature above 77° F (25° C) are required as specified in NFPA No. 20.

Standby fire pump ratings represent the output which may be utilized to drive stationary fire pumps where the pumping equipment has been sized according to ULI, ULC, and FM procedures.

Materials and specifications are subject to change without notice.

The International System of Units (SI) is used in the publication.

LEHQ5346 (7-95)
Supersedes LEHQ8570

Printed in U.S.A.

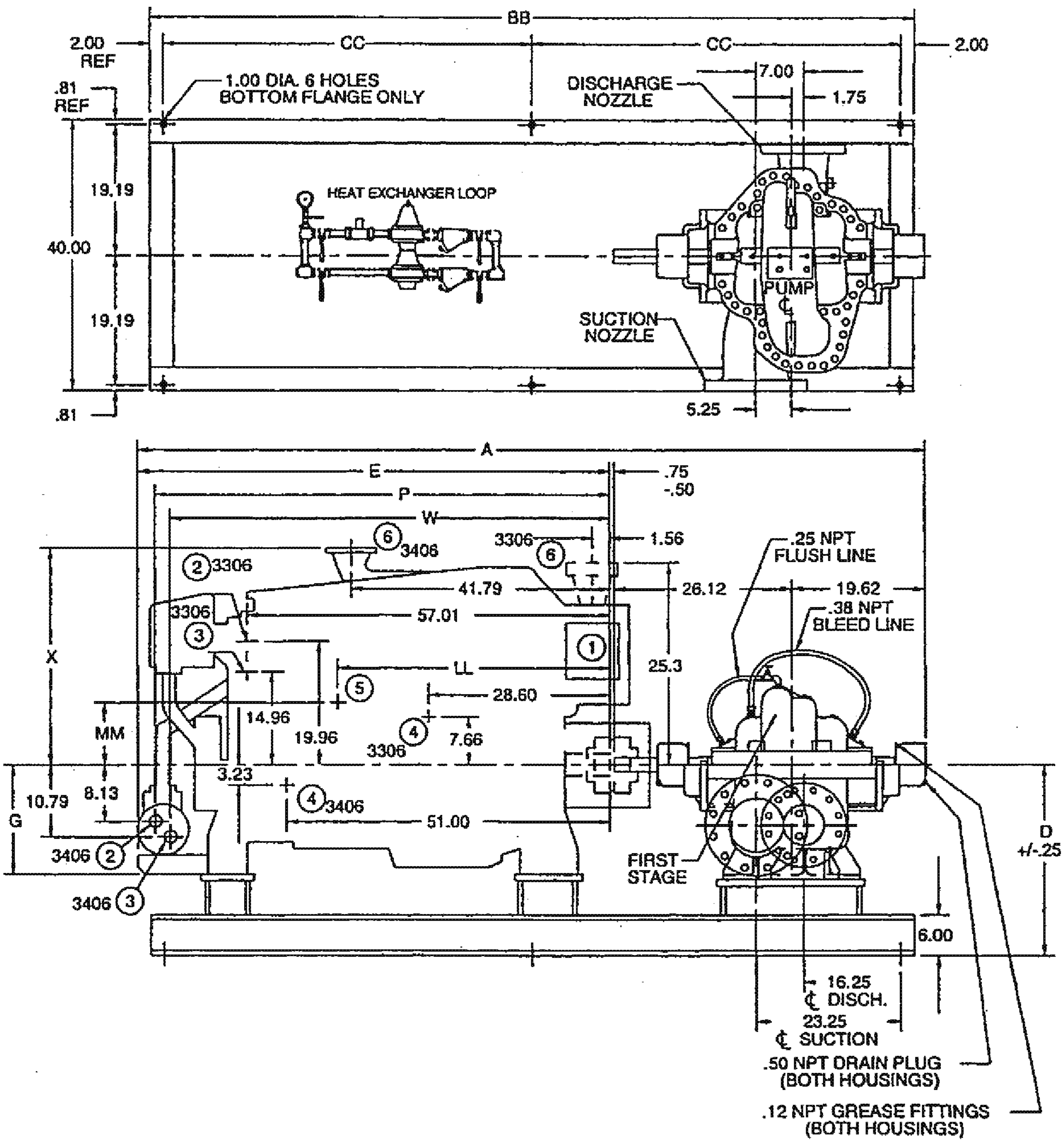
A-C Fire Pump Systems

ITT Industries
Engineered for life

FIRE PUMP SYSTEMS

Dimensions – Caterpillar Engines Models 3406B-DIT, 3406B-DITA – 8x6x18F 8200 Series Pump Clockwise Rotation

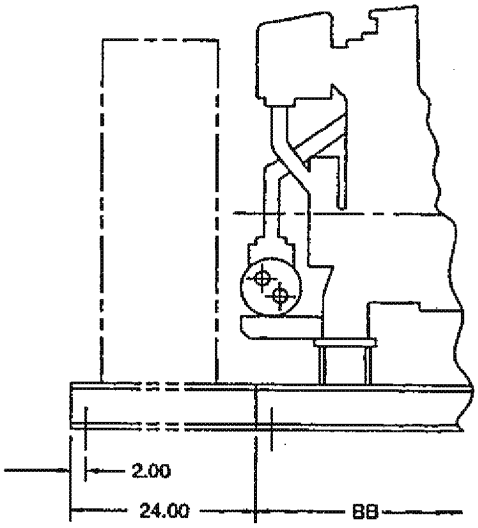
AC FIRE PUMP



NOT FOR CONSTRUCTION, INSTALLATION OR APPLICATION PURPOSES UNLESS CERTIFIED.

CERTIFIED FOR:						APPROVAL UL ☐ FM ☐ ULC ☐		
CUSTOMER ORDER NO:			IDENTIFICATION NO:				FLANGES	
PUMP DATA	SIZE	MODEL	CURVE NO.	GPM	HEAD (FT.)	ROTATION	SUCTION	DISCHARGE
		150				CW		
ENGINE DATA	MAKE	MODEL	HP	RPM	VOLTAGE	POLARITY	MAX ALTITUDE	
	CATERPILLAR					NEG.		
SHOP ORDER:		CERTIFIED BY:			TOTAL WEIGHT		DATE	

PUMP	ENGINE	A	D	E	G	S & Z	BB	CC	LL	MM	APPROX. PUMP WT.	APPROX. ENGINE WT.
8x6x18F	3406B-DIT	120.6	31.00	74.1	17.0	11.00	120.0	58.0	49.88	5.34	1750	2960
8x6x18F	3406B-DITA	120.6	31.00	74.1	17.0	11.00	120.0	58.0	49.88	5.34	1750	3240



OPTIONAL: BASE MOUNTED CONTROLLER IS MOUNTED WITH DOOR ON REAR. DOOR IS HINGED ON LEFT. ADD 25" TO BB (LENGTH OF BASE) AND 2 ADDITIONAL 1.0 DIAMETER HOLES

NOTES

1. All Dimensions are inches with ±.125" tolerance unless otherwise specified.
2. Suction and discharge connections per ANSI B16.1. Holes in flanges straddle ℄.
3. Baseplate setting (before piping), grouting procedures and final alignment must be in accordance with ITT A-C Fire Pump Systems recommended procedures outlined in the Instruction Manual associated with this pump type.
4. Both suction and discharge pipes must be supported independently near the pump to reduce strain on the pump casing. Also expansion joints, if used must not exert force on casing.
5. Coupling guard to meet ANSI/OSHA requirements.
6. Heater voltage requirement: 120/240 VAC 3000 Watt. Do not energize until engine coolant has been installed.
7. These units are available in both standard and high working pressures. Unit is denoted with an "H" prefix when specifying high working pressure. Example H6x4x12F. Refer to engineering data for actual working pressure values. High pressure pumps have 250 F.F. flanges per ANSI B16.1 unless noted.

Item No.	Description	Engine Model	
		3306	3406[1]
①	Heater Junction Box	(See Note 6)	(See Note 6)
②	Raw Water-Outlet	1.5 NPT	2.0 NPT
③	Raw Water-Inlet	1.5 NPT	2.0 NPT
④	Fuel Supply Conn.	.75-16*	.38 NPT
⑤	Fuel Return Conn.	.44-20*	.38 NPT
⑥	Exhaust Outlet Conn.	5.0 NPT*	See footnote below

* Far side

1. 3406 Wet - 6" NPT; 3406 Dry - 6" FLG.

ATTACHMENT 11D
MODULE 11
OEPA APPLICATION FORMS

Section II - Specific Air Contaminant Source Information

NOTE: One copy of this section should be filled out for each air contaminant source covered by this PTI application. See the line by line PTI instructions for additional information.

1. Company identification (name for air contaminant source for which you are applying): EMERGENCY GENERATOR

2. List all equipment that are part of this air contaminant source: 1 2-MW EMERGENCY GENERATOR

3. Air Contaminant Source Installation or Modification Schedule (must be completed regardless of date of installation or modification):

   When did/will you begin to install or modify the air contaminant source? (month/year) SECOND QUARTER 2008

   When did/will you begin to operate the air contaminant source? (month/year) THIRD QUARTER 2011 **OR** after issuance of PTI ______________

4. Emissions Information: The following table requests information needed to determine the applicable requirements and the compliance status of this air contaminant source with those requirements. Suggestions for how to estimate emissions may be found in the instructions to the Emissions Activity Category (EAC) forms required with this application. If you need further assistance, contact your Ohio EPA permit representative.

   - If total potential emissions of HAPs or any Air Toxic is greater than 1 ton/yr, fill in the table for that (those) pollutant(s). For all other pollutants, if "Emissions before controls (max), lb/hr" multiplied by 24 hours/day is greater than 10 lb/day, fill in the table for that pollutant.
   - If you have no add-on control equipment, "Emissions before controls= will be the same as "Actual emissions"
   - Annual emissions should be based on operating 8760 hr/yr unless you are requesting operating restrictions to limit emissions in line # 8 or have described inherent limitations below.
   - If you use units other than lb/hr or ton/yr, specify the units used (e.g., gr/dscf, lb/ton charged, lb/MMBtu, ton/12-months).
   - Requested Allowable (ton/yr) is often equivalent to Potential to Emit (PTE) as defined in OAC rule 3745-31-01 and OAC rule 3745-77-01.

Pollutant	Emissions before controls (max) (lb/hr)	Actual emissions (lb/hr)	Actual emissions (ton/year)	Requested Allowable (lb/hr)	Requested Allowable (ton/year)
Particulate emissions (PE) (formerly particulate matter, PM)	0.87	0.87	0.22	0.87	0.22
PM_{10} (PM < 10 microns in diameter)	0.87	0.87	0.22	0.87	0.22
Sulfur dioxide (SO_2)	0.03	0.03	0.01	0.03	0.01
Nitrogen oxides (NO_x)	26.4	26.4	6.61	26.4	6.61
Carbon monoxide (CO)	15.2	15.2	3.8	15.2	3.8
Organic compounds (OC)	1.4	1.4	0.35	1.4	0.35
Volatile organic compounds (VOC)	1.4	1.4	0.35	1.4	0.35
Total HAPs	0.03	0.03	0.007	0.03	0.007
Highest single HAP: (benzene)	0.01	0.01	0.004	0.01	0.004
Air Toxics (see instructions):	0.03	0.03	0.007	0.03	0.007

Provide your calculations as an attachment and explain how all process variables and emission factors were selected. Note the emissions factor(s) employed and document the origin. Example: AP-42, Table 4.4-3 (8/97); stack test, Method 5, 4/96; mass balance based on MSDS; etc.

Section II - Specific Air Contaminant Source Information

5. **Does this air contaminant source employ emissions control equipment?**

☐ **Yes** - fill out the applicable information below.

☒ **No** - proceed to item # 6.

Note: Pollutant abbreviations used below: Particulates = PE; Organic compounds = OC; Sulfur dioxide = SO_2; Nitrogen oxides = NOx; Carbon monoxide = CO

☐ **Cyclone/Multiclone**

Manufacturer: ____________ Year installed: ____________
What do you call this control equipment: ____________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ____________
Estimated capture efficiency (%): ________ Basis for efficiency: ____________
Design control efficiency (%): ________ Basis for efficiency: ____________
Type: ☐ Cyclone ☐ Multiclone ☐ Rotoclone ☐ Other ____________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:
____

☐ **Fabric Filter/Baghouse**

Manufacturer: ____________ Year installed: ____________
What do you call this control equipment: ____________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ____________
Estimated capture efficiency (%): ________ Basis for efficiency: ____________
Design control efficiency (%): ________ Basis for efficiency: ____________
Operating pressure drop range (inches of water): Minimum: ________ Maximum: ________
Pressure type: ☐ Negative pressure ☐ Positive pressure
Fabric cleaning mechanism: ☐ Reverse air ☐ Pulse jet ☐ Shaker ☐ Other ____________
☐ Lime injection or fabric coating agent used: Type: ________ Feed rate: ________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:
____

☐ **Wet Scrubber**

Manufacturer: ____________ Year installed: ____________
What do you call this control equipment: ____________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ____________
Estimated capture efficiency (%): ________ Basis for efficiency: ____________
Design control efficiency (%): ________ Basis for efficiency: ____________
Type: ☐ Spray chamber ☐ Packed bed ☐ Impingement ☐ Venturi ☐ Other ____________
Operating pressure drop range (inches of water): Minimum: ________ Maximum: ________
pH range for scrubbing liquid: Minimum: ________ Maximum: ________
Scrubbing liquid flow rate (gal/min): ________
Is scrubber liquid recirculated? ☐ Yes ☐ No
Water supply pressure (psig): ________ NOTE: This item for spray chambers only.
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:
____

☐ **Electrostatic Precipitator**

Manufacturer: ____________ Year installed: ____________
What do you call this control equipment: ____________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ____________
Estimated capture efficiency (%): ________ Basis for efficiency: ____________
Design control efficiency (%): ________ Basis for efficiency: ____________

Section II - Specific Air Contaminant Source Information

Type: ☐ Plate-wire ☐ Flat-plate ☐ Tubular ☐ Wet ☐ Other ___________
Number of operating fields: ___________

☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:

____

☐ **Concentrator**

Manufacturer: ____________________ Year installed: ____________________
What do you call this control equipment: ____________________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ___________
Estimated capture efficiency (%):________ Basis for efficiency: ____________________
Design regeneration cycle time (minutes): ___________
Minimum desorption air stream temperature (^oF): ________
Rotational rate (revolutions/hour): ___________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:

____

☐ **Catalytic Incinerator**

Manufacturer: ____________________ Year installed: ____________________
What do you call this control equipment: ____________________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ___________
Estimated capture efficiency (%):________ Basis for efficiency: ____________________
Design control efficiency (%):________ Basis for efficiency: ____________________
Minimum inlet gas temperature (^oF): ___________
Combustion chamber residence time (seconds): ___________
Minimum temperature difference (^oF) across catalyst during air contaminant source operation: ________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:

____

☐ **Thermal Incinerator/Thermal Oxidizer**

Manufacturer: ____________________ Year installed: ____________________
What do you call this control equipment: ____________________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ___________
Estimated capture efficiency (%):________ Basis for efficiency: ____________________
Design control efficiency (%):________ Basis for efficiency: ____________________
Minimum operating temperature (^oF) and location: ____________________ (See line by line instructions.)
Combustion chamber residence time (seconds): ___________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:

____

☐ **Flare**

Manufacturer: ____________________ Year installed: ____________________
What do you call this control equipment: ____________________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ___________
Estimated capture efficiency (%):________ Basis for efficiency: ____________________
Design control efficiency (%):________ Basis for efficiency: ____________________
Type: ☐ Enclosed ☐ Elevated (open)
Ignition device: ☐ Electric arc ☐ Pilot flame
Flame presence sensor: ☐ Yes ☐ No
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:

Section II - Specific Air Contaminant Source Information

☐ **Condenser**

Manufacturer: ____________ Year installed: ____________
What do you call this control equipment: ____________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ____________
Estimated capture efficiency (%):________ Basis for efficiency: ____________
Design control efficiency (%):________ Basis for efficiency: ____________

Type: ☐ Indirect contact ☐ Direct contact
Maximum exhaust gas temperature (°F) during air contaminant source operation: ________
Coolant type: ____________
Design coolant temperature (°F): Minimum ________ Maximum ________
Design coolant flow rate (gpm): ____________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:

☐ **Carbon Absorber**

Manufacturer: ____________ Year installed: ____________
What do you call this control equipment: ____________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ____________
Estimated capture efficiency (%):________ Basis for efficiency: ____________
Design control efficiency (%):________ Basis for efficiency: ____________
Type: ☐ On-site regenerative ☐ Disposable
Maximum design outlet organic compound concentration (ppmv): ____________
Carbon replacement frequency or regeneration cycle time (specify units): ____________
Maximum temperature of the carbon bed, after regeneration (including any cooling cycle): ________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:

☐ **Dry Scrubber**

Manufacturer: ____________ Year installed: ____________
What do you call this control equipment: ____________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ____________
Estimated capture efficiency (%):________ Basis for efficiency: ____________
Design control efficiency (%):________ Basis for efficiency: ____________
Reagent(s) used: Type: ____________ Injection rate(s): ____________
Operating pressure drop range (inches of water): Minimum: ________ Maximum: ________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:

☐ **Paint booth filter**

Type: ☐ Paper ☐ Fiberglass ☐ Water curtain ☐ Other ____________
Design control efficiency (%):________ Basis for efficiency: ____________

☐ **Other, describe** ____________

Manufacturer: ____________ Year installed: ____________
What do you call this control equipment: ____________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ____________
Estimated capture efficiency (%):________ Basis for efficiency: ____________

Design control efficiency (%):________ Basis for efficiency: ____________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel

Section II - Specific Air Contaminant Source Information

List any other air contaminant sources that are also vented to this control equipment:

6. Attach a Process or Activity Flow Diagram to this application for each air contaminant source included in the application. The diagram should indicate their relationships to one another. See the line by line PTI instructions for additional information.

7. Emissions egress point(s) information: PTIs which allow total emissions in excess of the thresholds listed below will be subject to an air quality modeling analysis. This analysis is to assure that the impact from the requested project will not exceed Ohio=s Acceptable Incremental Impacts for criteria pollutants and/or Maximum Allowable Ground Level Concentrations (MAGLC) for air toxics. Permit requests that would have unacceptable impacts can not be approved as proposed. See the line by line PTI instructions for additional information.

Complete the tables below if the requested allowable annual emission rate for this PTI exceeds any of the following:

- Particulate Matter (PM10): 10 tons per year
- Sulfur Dioxide (SO2): 25 tons per year
- Nitrogen Oxides (NOx): 25 tons per year
- Carbon Monoxide (CO): 100 tons per year
- Air Toxic: 1 ton per year. An air toxic is any air pollutant for which the American Council of Governmental Industrial Hygienists (ACGIH) has established a Threshold Limit Value (TLV).

Complete Table 7-A below for each stack emissions egress point. An egress point is a point at which emissions from an air contaminant source are released into the ambient (outside) air. List each individual egress point on a separate line.

Table 7-A, Stack Egress Point Information

Company Name or ID for the Egress Point (examples: Stack A; Boiler Stack; etc.)	Type Code*	Stack Egress Point Shape and Dimensions (in)(examples: round 10 inch ID; rectangular 14 X 16 inches; etc.)	Stack Egress Point Height from the Ground (ft)	Stack Temp. at Max. Capacity (F)	Stack Flow Rate at Max. Capacity (ACFM)	Minimum Distance to the Property Line (ft)
Emergency Generator	A	Round, 12-inch ID (2)	10	860-890	14,000 – 15,500	> 200 (typ)

*Type codes for stack egress points:

A. vertical stack (unobstructed): There are no obstructions to upward flow in or on the stack such as a rain cap.
B. vertical stack (obstructed): There are obstructions to the upward flow, such as a rain cap, which prevents or inhibits the air flow in a vertical direction.
C. non-vertical stack: The stack directs the air flow in a direction which is not directly upward.

Complete Table 7-B below for each fugitive emissions egress point. List each individual egress point on a separate line. Refer to the description of the fugitive egress point type codes below the table for use in completing the type code column of the table. For air contaminant sources like roadways and storage piles, only the first 5 columns need to be completed. For an air contaminant source with multiple fugitive emissions egress points, include only the primary egress points.

Table 7-B, Fugitive Egress Point Information

Company ID for the Egress Point (examples; Garage Door B, Building C; Roof Monitor; etc.)	Type Code*	Egress Point Description (examples: garage door, 12 X 30 feet, west wall; outside gravel storage piles; etc.)	Fugitive Egress Point Height from the Ground (ft)	Minimum Distance to the Property Line (ft)	Exit Gas Temp. (F)
NA					

Section II - Specific Air Contaminant Source Information

*Type codes for fugitive egress point:

D. door or window
E. other opening in the building without a duct
F. no stack and no building enclosing the air contaminant source (e.g., roadways)

Complete Table 7-C below for each Stack Egress Point identified in Table 7-A above. In each case, use the dimensions of the largest nearby building, building segment or structure. List each individual egress point on a separate line. Use the same Company Name or ID for the Egress Point in Table 7-C that was used in Table 7-A. See the line by line PTI instructions for additional information.

Table 7-C, Egress Point Additional Information (Add rows as necessary)

Company ID or Name for the Egress Point	Building Height (ft)	Building Width (ft)	Building Length (ft)
Emergency Generator	15	80	100

8. Request for Federally Enforceable Limits

As part of this permit application, do you wish to propose voluntary restrictions to limit emissions in order to avoid specific requirements listed below, (i.e., are you requesting federally enforceable limits to obtain synthetic minor status)?

☐ yes
☒ no
☐ not sure - please contact me if this affects me

If yes, why are you requesting federally enforceable limits? Check all that apply.

a. ☐ to avoid being a major source (see OAC rule 3745-77-01)
b. ☐ to avoid being a major MACT source (see OAC rule 3745-31-01)
c. ☐ to avoid being a major modification (see OAC rule 3745-31-01)
d. ☐ to avoid being a major stationary source (see OAC rule 3745-31-01)
e. ☐ to avoid an air dispersion modeling requirement (see Engineering Guide # 69)
f. ☐ to avoid another requirement. Describe: ______________________

If you checked a., b. or d., please attach a facility-wide potential to emit (PTE) analysis (for each pollutant) and synthetic minor strategy to this application. (See line by line instructions for definition of PTE.) If you checked c., please attach a net emission change analysis to this application.

9. If this air contaminant source utilizes any continuous emissions monitoring equipment for indicating or demonstrating compliance, complete the following table. This does not include continuous parametric monitoring systems.

Company ID for Egress Point	Type of Monitor	Applicable performance specification (40 CFR 60, Appendix B)	Pollutant(s) Monitored
NA			

10. Do you wish to permit this air contaminant source as a portable source, allowing relocation within the state in accordance with OAC rule 3745-31-03 or OAC rule 3745-31-05?

☐ yes - Note: notification requirements in rules cited above must be followed.
☒ no

11. The appropriate Emissions Activity Category (EAC) form(s) must be completed and attached for each air contaminant source. At least one complete EAC form must be submitted for each air contaminant source for the application to be considered complete. Refer to the list attached to the PTI instructions.

FOR OHIO EPA USE
FACILITY ID: ____________
EU ID: ______ PTI#: __________

EMISSIONS ACTIVITY CATEGORY FORM
STATIONARY INTERNAL COMBUSTION ENGINE – EMERGENCY GENERATOR

This form is to be completed for each stationary reciprocating or gas turbine engine. State/Federal regulations which may apply to stationary internal combustion engines are listed in the instructions. Note that there may be other regulations which apply to this emissions unit which are not included in this list.

1. Reason this form is being submitted (Check one)

   ☒ New Permit ☐ Renewal or Modification of Air Permit Number (e.g. P001) Generator

2. Maximum Operating Schedule: up to 10 hours per day; ≤ 50 days per year

   If the schedule is less than 24 hours/day or 365 days/year, what limits the schedule to less than maximum? See instructions for examples. Run time based on maintenance and testing schedule

3. Engine type: ☐ Gas turbine ☒ Reciprocating

4. Purpose of engine: ☐ Driving pump or compressor ☒ Driving electrical generator

5. Normal use of engine: ☒ Emergency only ☐ Non-emergency

6. Engine Manufacturer: _To Be Determined___ Model No: _To Be Determined______

7. Engine exhaust configuration: (for turbines only)
   - ☒ simple cycle *(no heat recovery)*
   - ☐ regenerative cycle *(heat recovery to preheat combustion air)*
   - ☐ cogeneration cycle *(heat recovered to produce steam)*
   - ☐ combined cycle *(heat recovered to produce steam which drives generator)*

8. Input capacities (million BTU/hr): Rated ________ Maximum ________ Normal 17.5

   Supplemental burner (duct burner) input capacity, if equipped (million BTU/hr):

   Rated:________ Maximum ________ Normal ________

9. Output capacities (Horsepower): Rated: 2680 Maximum 2922 Normal 2650

   (Kilowatts): Rated: ________ Maximum ________ Normal ________

   (lbs steam/hr)*: Rated: ________ Maximum ________ Normal ________

   **required for cogeneration or combined cycle units only*

10. Type of ignition: ☒ non-spark (diesel) ☐ spark

11. Type of fuel fired (check all that apply):

☐ single fuel
☐ dual fuel
☒ No. 2 oil, low-sulfur
☐ No. 2 oil, high-sulfur
☐ gasoline
☐ other, explain ____________
☐ natural gas
☐ diesel
☐ landfill gas
☐ digester gas
☐ propane

12. Complete the following table for all fuels identified in question 11 that are used for the engine and any supplemental (duct) burners, if equipped:

Fuel	Heat Content (BTU/unit)	wt.% Ash	wt.% Sulfur	Fuel Usage		
				Estimated Maximum Per Year	Normal Per Hour	Max. Per Hour
Nat. gas	BTU/cu ft		gr/scf	cu ft	cu ft	cu ft
No. 2 oil	137,100 BTU/gal	.01	.05	62,500 gal	125 gal	125 gal
Gasoline	BTU/gal			gal	gal	gal
Diesel	BTU/gal			gal	gal	gal
Landfill/digester gas	BTU/cu ft		ppm	cu ft	cu ft	cu ft
Other (show units)						
List supplemental (duct) burner fuel and information below (show units):						

13. Type of combustion cycle (check all that apply):

☐ 2-stroke
☐ rich-burn
☐ carbureted
☐ other, explain ____________
☒ 4-stroke
☐ lean-burn
☒ fuel injected

14. Emissions control techniques (check all that apply):

☐ prestratified charge
☐ catalytic oxidation (CO)
☐ air/fuel ratio
☐ 2-stage rich/lean combustion
☐ water/steam injection
☐ nonselective catalytic reduction (NSCR)
☐ selective catalytic reduction (SCR)
☒ injection timing retard (ITR)
☐ 2-stage lean/lean combustion
☐ preignition chamber combustion (PCC)
☒ other, explain: LOW SULFUR FUEL, TURBOCHARGING & AFTERCOOLING

For each emissions control technique checked above, explain what pollutants are controlled by each technique: LOW SULFUR FUEL REDUCES SOx BY LIMITING AVAILABLE SULFUR. TURBOCHARING AND AFTERCOOLING REDUCES CO & VOC THROUGH MORE COMPLETE COMBUSTION. INJECTION TIMING RETARD REDUCES NOX BY MOVING THE IGNITION EVENT TO LATER IN THE POWER STROKE THEREBY REDUCING THE PEAK FLAME TEMPERATURE AND RESULTANT THERMAL NOx.

Section II - Specific Air Contaminant Source Information

NOTE: One copy of this section should be filled out for each air contaminant source covered by this PTI application. See the line by line PTI instructions for additional information.

1. Company identification (name for air contaminant source for which you are applying): FIRE PUMP ENGINE 1

2. List all equipment that are part of this air contaminant source: FIRE PUMP ENGINE 1

3. Air Contaminant Source Installation or Modification Schedule (must be completed regardless of date of installation or modification):

   When did/will you begin to install or modify the air contaminant source? (month/year) SECOND QUARTER 2008

   When did/will you begin to operate the air contaminant source? (month/year) THIRD QUARTER 2011 **OR** after issuance of PTI ______________

4. Emissions Information: The following table requests information needed to determine the applicable requirements and the compliance status of this air contaminant source with those requirements. Suggestions for how to estimate emissions may be found in the instructions to the Emissions Activity Category (EAC) forms required with this application. If you need further assistance, contact your Ohio EPA permit representative.

   - If total potential emissions of HAPs or any Air Toxic is greater than 1 ton/yr, fill in the table for that (those) pollutant(s). For all other pollutants, if "Emissions before controls (max), lb/hr" multiplied by 24 hours/day is greater than 10 lb/day, fill in the table for that pollutant.
   - If you have no add-on control equipment, "Emissions before controls= will be the same as "Actual emissions"
   - Annual emissions should be based on operating 8760 hr/yr unless you are requesting operating restrictions to limit emissions in line # 8 or have described inherent limitations below.
   - If you use units other than lb/hr or ton/yr, specify the units used (e.g., gr/dscf, lb/ton charged, lb/MMBtu, ton/12-months).
   - Requested Allowable (ton/yr) is often equivalent to Potential to Emit (PTE) as defined in OAC rule 3745-31-01 and OAC rule 3745-77-01.

Pollutant	Emissions before controls (max) (lb/hr)	Actual emissions (lb/hr)	Actual emissions (ton/year)	Requested Allowable (lb/hr)	Requested Allowable (ton/year)
Particulate emissions (PE) (formerly particulate matter, PM)	0.27	0.27	0.07	0.27	0.07
PM_{10} (PM < 10 microns in diameter)	0.27	0.27	0.07	0.27	0.07
Sulfur dioxide (SO_2)	0.62	0.62	0.15	0.62	0.15
Nitrogen oxides (NO_x)	4.9	4.9	1.23	4.9	1.23
Carbon monoxide (CO)	1.72	1.72	0.43	1.72	0.43
Organic compounds (OC)	0.26	0.26	0.07	0.26	0.07
Volatile organic compounds (VOC)	0.26	0.26	0.07	0.26	0.07
Total HAPs	0.01	0.01	0.002	0.01	0.002
Highest single HAP: (formaldehyde)	0.002	0.002	0.0006	0.002	0.0006
Air Toxics (see instructions):	0.01	0.01	0.002	0.01	0.002

Provide your calculations as an attachment and explain how all process variables and emission factors were selected. Note the emissions factor(s) employed and document the origin. Example: AP-42, Table 4.4-3 (8/97); stack test, Method 5, 4/96; mass balance based on MSDS; etc.

Section II - Specific Air Contaminant Source Information

5. **Does this air contaminant source employ emissions control equipment?**

☐ **Yes** - fill out the applicable information below.

☒ **No** - proceed to item # 6.

Note: Pollutant abbreviations used below: Particulates = PE; Organic compounds = OC; Sulfur dioxide = SO_2; Nitrogen oxides = NOx; Carbon monoxide = CO

☐ **Cyclone/Multiclone**

Manufacturer: ________ Year installed: ________
What do you call this control equipment: ________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ________
Estimated capture efficiency (%): ________ Basis for efficiency: ________
Design control efficiency (%): ________ Basis for efficiency: ________
Type: ☐ Cyclone ☐ Multiclone ☐ Rotoclone ☐ Other ________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:
____

☐ **Fabric Filter/Baghouse**

Manufacturer: ________ Year installed: ________
What do you call this control equipment: ________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ________
Estimated capture efficiency (%): ________ Basis for efficiency: ________
Design control efficiency (%): ________ Basis for efficiency: ________
Operating pressure drop range (inches of water): Minimum: ________ Maximum: ________
Pressure type: ☐ Negative pressure ☐ Positive pressure
Fabric cleaning mechanism: ☐ Reverse air ☐ Pulse jet ☐ Shaker ☐ Other ________
☐ Lime injection or fabric coating agent used: Type: ________ Feed rate: ________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:
____

☐ **Wet Scrubber**

Manufacturer: ________ Year installed: ________
What do you call this control equipment: ________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ________
Estimated capture efficiency (%): ________ Basis for efficiency: ________
Design control efficiency (%): ________ Basis for efficiency: ________
Type: ☐ Spray chamber ☐ Packed bed ☐ Impingement ☐ Venturi ☐ Other ________
Operating pressure drop range (inches of water): Minimum: ________ Maximum: ________
pH range for scrubbing liquid: Minimum: ________ Maximum: ________
Scrubbing liquid flow rate (gal/min): ________
Is scrubber liquid recirculated? ☐ Yes ☐ No
Water supply pressure (psig): ________ NOTE: This item for spray chambers only.
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:
____

☐ **Electrostatic Precipitator**

Manufacturer: ________ Year installed: ________
What do you call this control equipment: ________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ________
Estimated capture efficiency (%): ________ Basis for efficiency: ________
Design control efficiency (%): ________ Basis for efficiency: ________

Section II - Specific Air Contaminant Source Information

Type: ☐ Plate-wire ☐ Flat-plate ☐ Tubular ☐ Wet ☐ Other ____________
Number of operating fields: ____________

☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:

____

☐ **Concentrator**

Manufacturer: ____________________ Year installed: ____________________
What do you call this control equipment: ____________________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ____________
Estimated capture efficiency (%):__________ Basis for efficiency: ____________________
Design regeneration cycle time (minutes): ____________
Minimum desorption air stream temperature (°F): __________
Rotational rate (revolutions/hour): ____________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:

____

☐ **Catalytic Incinerator**

Manufacturer: ____________________ Year installed: ____________________
What do you call this control equipment: ____________________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ____________
Estimated capture efficiency (%):__________ Basis for efficiency: ____________________
Design control efficiency (%):__________ Basis for efficiency: ____________________
Minimum inlet gas temperature (°F): ____________
Combustion chamber residence time (seconds): ____________
Minimum temperature difference (°F) across catalyst during air contaminant source operation: ________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:

____

☐ **Thermal Incinerator/Thermal Oxidizer**

Manufacturer: ____________________ Year installed: ____________________
What do you call this control equipment: ____________________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ____________
Estimated capture efficiency (%):__________ Basis for efficiency: ____________________
Design control efficiency (%):__________ Basis for efficiency: ____________________
Minimum operating temperature (°F) and location: ____________________ (See line by line instructions.)
Combustion chamber residence time (seconds): ____________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:

____

☐ **Flare**

Manufacturer: ____________________ Year installed: ____________________
What do you call this control equipment: ____________________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ____________
Estimated capture efficiency (%):__________ Basis for efficiency: ____________________
Design control efficiency (%):__________ Basis for efficiency: ____________________
Type: ☐ Enclosed ☐ Elevated (open)
Ignition device: ☐ Electric arc ☐ Pilot flame
Flame presence sensor: ☐ Yes ☐ No
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:

Section II - Specific Air Contaminant Source Information

☐ **Condenser**
Manufacturer: ____________ Year installed: ____________
What do you call this control equipment: ____________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ____________
Estimated capture efficiency (%):________ Basis for efficiency: ____________
Design control efficiency (%):________ Basis for efficiency: ____________

Type: ☐ Indirect contact ☐ Direct contact
Maximum exhaust gas temperature (°F) during air contaminant source operation: ________
Coolant type: ____________
Design coolant temperature (°F): Minimum ________ Maximum ________
Design coolant flow rate (gpm): ____________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:

☐ **Carbon Absorber**
Manufacturer: ____________ Year installed: ____________
What do you call this control equipment: ____________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ____________
Estimated capture efficiency (%):________ Basis for efficiency: ____________
Design control efficiency (%):________ Basis for efficiency: ____________
Type: ☐ On-site regenerative ☐ Disposable
Maximum design outlet organic compound concentration (ppmv): ____________
Carbon replacement frequency or regeneration cycle time (specify units): ____________
Maximum temperature of the carbon bed, after regeneration (including any cooling cycle): ________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:

☐ **Dry Scrubber**
Manufacturer: ____________ Year installed: ____________
What do you call this control equipment: ____________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ____________
Estimated capture efficiency (%):________ Basis for efficiency: ____________
Design control efficiency (%):________ Basis for efficiency: ____________
Reagent(s) used: Type: ____________ Injection rate(s): ____________
Operating pressure drop range (inches of water): Minimum: ________ Maximum: ________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:

☐ **Paint booth filter**
Type: ☐ Paper ☐ Fiberglass ☐ Water curtain ☐ Other ____________
Design control efficiency (%):________ Basis for efficiency: ____________

☐ **Other**, describe ____________
Manufacturer: ____________ Year installed: ____________
What do you call this control equipment: ____________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ____________
Estimated capture efficiency (%):________ Basis for efficiency: ____________

Design control efficiency (%):________ Basis for efficiency: ____________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel

Section II - Specific Air Contaminant Source Information

List any other air contaminant sources that are also vented to this control equipment:

6. Attach a Process or Activity Flow Diagram to this application for each air contaminant source included in the application. The diagram should indicate their relationships to one another. See the line by line PTI instructions for additional information.

7. Emissions egress point(s) information: PTIs which allow total emissions in excess of the thresholds listed below will be subject to an air quality modeling analysis. This analysis is to assure that the impact from the requested project will not exceed Ohio=s Acceptable Incremental Impacts for criteria pollutants and/or Maximum Allowable Ground Level Concentrations (MAGLC) for air toxics. Permit requests that would have unacceptable impacts can not be approved as proposed. See the line by line PTI instructions for additional information.

Complete the tables below if the requested allowable annual emission rate for this PTI exceeds any of the following:

- Particulate Matter (PM10): 10 tons per year
- Sulfur Dioxide (SO2): 25 tons per year
- Nitrogen Oxides (NOx): 25 tons per year
- Carbon Monoxide (CO): 100 tons per year
- Air Toxic: 1 ton per year. An air toxic is any air pollutant for which the American Council of Governmental Industrial Hygienists (ACGIH) has established a Threshold Limit Value (TLV).

Complete Table 7-A below for each stack emissions egress point. An egress point is a point at which emissions from an air contaminant source are released into the ambient (outside) air. List each individual egress point on a separate line.

Table 7-A, Stack Egress Point Information

Company Name or ID for the Egress Point (examples: Stack A; Boiler Stack; etc.)	Type Code*	Stack Egress Point Shape and Dimensions (in)(examples: round 10 inch ID; rectangular 14 X 16 inches; etc.)	Stack Egress Point Height from the Ground (ft)	Stack Temp. at Max. Capacity (F)	Stack Flow Rate at Max. Capacity (ACFM)	Minimum Distance to the Property Line (ft)
Fire Pump 1	A	Round 6-inch ID	10	800-900	1,000	750

*Type codes for stack egress points:

A. vertical stack (unobstructed): There are no obstructions to upward flow in or on the stack such as a rain cap.
B. vertical stack (obstructed): There are obstructions to the upward flow, such as a rain cap, which prevents or inhibits the air flow in a vertical direction.
C. non-vertical stack: The stack directs the air flow in a direction which is not directly upward.

Complete Table 7-B below for each fugitive emissions egress point. List each individual egress point on a separate line. Refer to the description of the fugitive egress point type codes below the table for use in completing the type code column of the table. For air contaminant sources like roadways and storage piles, only the first 5 columns need to be completed. For an air contaminant source with multiple fugitive emissions egress points, include only the primary egress points.

Table 7-B, Fugitive Egress Point Information

Company ID for the Egress Point (examples; Garage Door B, Building C; Roof Monitor; etc.)	Type Code*	Egress Point Description (examples: garage door, 12 X 30 feet, west wall; outside gravel storage piles; etc.)	Fugitive Egress Point Height from the Ground (ft)	Minimum Distance to the Property Line (ft)	Exit Gas Temp. (F)
NA					

*Type codes for fugitive egress point:

D. door or window
E. other opening in the building without a duct
F. no stack and no building enclosing the air contaminant source (e.g., roadways)

Complete Table 7-C below for each Stack Egress Point identified in Table 7-A above. In each case, use the dimensions o the largest nearby building, building segment or structure. List each individual egress point on a separate line. Use the same Company Name or ID for the Egress Point in Table 7-C that was used in Table 7-A. See the line by line PTI instructions for additional information.

Table 7-C, Egress Point Additional Information (Add rows as necessary)

Company ID or Name for the Egress Point	Building Height (ft)	Building Width (ft)	Building Length (ft)
Fire Pump 1	20	370	900

8. Request for Federally Enforceable Limits

As part of this permit application, do you wish to propose voluntary restrictions to limit emissions in order to avoid specific requirements listed below, (i.e., are you requesting federally enforceable limits to obtain synthetic minor status)?

☐ yes
☒ no
☐ not sure - please contact me if this affects me

If yes, why are you requesting federally enforceable limits? Check all that apply.

a. ☐ to avoid being a major source (see OAC rule 3745-77-01)
b. ☐ to avoid being a major MACT source (see OAC rule 3745-31-01)
c. ☐ to avoid being a major modification (see OAC rule 3745-31-01)
d. ☐ to avoid being a major stationary source (see OAC rule 3745-31-01)
e. ☐ to avoid an air dispersion modeling requirement (see Engineering Guide # 69)
f. ☐ to avoid another requirement. Describe: ____________________

If you checked a., b. or d., please attach a facility-wide potential to emit (PTE) analysis (for each pollutant) and synthetic minor strategy to this application. (See line by line instructions for definition of PTE.) If you checked c., please attach a net emission change analysis to this application.

9. If this air contaminant source utilizes any continuous emissions monitoring equipment for indicating or demonstrating compliance, complete the following table. This does not include continuous parametric monitoring systems.

Company ID for Egress Point	Type of Monitor	Applicable performance specification (40 CFR 60, Appendix B)	Pollutant(s) Monitored
NA			

10. Do you wish to permit this air contaminant source as a portable source, allowing relocation within the state in accordance with OAC rule 3745-31-03 or OAC rule 3745-31-05?

☐ yes - Note: notification requirements in rules cited above must be followed.
☒ no

11. The appropriate Emissions Activity Category (EAC) form(s) must be completed and attached for each air contaminant source. At least one complete EAC form must be submitted for each air contaminant source for the application to be considered complete. Refer to the list attached to the PTI instructions.

FOR OHIO EPA USE
FACILITY ID: ____________
EU ID: ______ PTI#: ________

EMISSIONS ACTIVITY CATEGORY FORM
STATIONARY INTERNAL COMBUSTION ENGINE - FIRE PUMP 1

This form is to be completed for each stationary reciprocating or gas turbine engine. State/Federal regulations which may apply to stationary internal combustion engines are listed in the instructions. Note that there may be other regulations which apply to this emissions unit which are not included in this list.

1. Reason this form is being submitted (Check one)

   ☒ New Permit ☐ Renewal or Modification of Air Permit Number (e.g. P001) Fire Pump Engine 1

2. Maximum Operating Schedule: _up to 10___ hours per day; __≤ 50__ days per year

   If the schedule is less than 24 hours/day or 365 days/year, what limits the schedule to less than maximum? See instructions for examples. ______Run time based on Maintenance Schedule _

3. Engine type: ☐ Gas turbine ☒ Reciprocating

4. Purpose of engine: ☒ Driving pump or compressor ☐ Driving electrical generator

5. Normal use of engine: ☒ Emergency only ☐ Non-emergency

6. Engine Manufacturer: __To Be Determined______ Model No: __To Be Determined_______

7. Engine exhaust configuration: (for turbines only)
   ☒ simple cycle *(no heat recovery)*
   ☐ regenerative cycle *(heat recovery to preheat combustion air)*
   ☐ cogeneration cycle *(heat recovered to produce steam)*
   ☐ combined cycle *(heat recovered to produce steam which drives generator)*

8. Input capacities (million BTU/hr): Rated ________ Maximum ________ Normal __2.25______

   Supplemental burner (duct burner) input capacity, if equipped (million BTU/hr):

   Rated:_________ Maximum ___________ Normal ___________

9. Output capacities (Horsepower): Rated: 325 Maximum ___________ Normal 300

   (Kilowatts): Rated: _________ Maximum ___________ Normal ___________

   (lbs steam/hr)*: Rated: _________ Maximum ___________ Normal ___________

* *required for cogeneration or combined cycle units only*

10. Type of ignition: [x] non-spark (diesel) [ ] spark

11. Type of fuel fired (check all that apply):

[ ] single fuel
[ ] dual fuel
[x] No. 2 oil, low-sulfur
[ ] No. 2 oil, high-sulfur
[ ] gasoline
[ ] other, explain ______________________
[ ] natural gas
[ ] diesel
[ ] landfill gas
[ ] digester gas
[ ] propane

12. Complete the following table for all fuels identified in question 11 that are used for the engine and any supplemental (duct) burners, if equipped:

Fuel	Heat Content (BTU/unit)	wt.% Ash	wt.% Sulfur	Fuel Usage: Estimated Maximum Per Year	Fuel Usage: Normal Per Hour	Fuel Usage: Max. Per Hour
Nat. gas	BTU/cu ft		gr/scf	cu ft	cu ft	cu ft
No. 2 oil	137,100 BTU/gal	0.01	0.05	8,050 gal	16.1 gal	16.1 gal
Gasoline	BTU/gal			gal	gal	gal
Diesel	BTU/gal			gal	gal	gal
Landfill/digester gas	BTU/cu ft		ppm	cu ft	cu ft	cu ft
Other (show units)						
List supplemental (duct) burner fuel and information below (show units):						

13. Type of combustion cycle (check all that apply):

[ ] 2-stroke
[ ] rich-burn
[ ] carbureted
[ ] other, explain ______________________
[x] 4-stroke
[ ] lean-burn
[x] fuel injected

14. Emissions control techniques (check all that apply):

[ ] prestratified charge
[ ] catalytic oxidation (CO)
[ ] air/fuel ratio
[ ] 2-stage rich/lean combustion
[ ] water/steam injection
[ ] nonselective catalytic reduction (NSCR)
[ ] selective catalytic reduction (SCR)
[x] injection timing retard (ITR)
[ ] 2-stage lean/lean combustion
[ ] preignition chamber combustion (PCC)
[x] other, explain: LOW SULFUR FUEL, TURBOCHARGING & AFTERCOOLING

For each emissions control technique checked above, explain what pollutants are controlled by each technique: LOW SULFUR FUEL REDUCES SOx BY LIMITING AVAILABLE SULFUR. TURBOCHARING AND AFTERCOOLING REDUCES CO & VOC THROUGH MORE COMPLETE COMBUSTION. INJECTION TIMING RETARD REDUCES NOX BY MOVING THE IGNITION EVENT TO LATER IN THE POWER STROKE THEREBY REDUCING THE PEAK FLAME TEMPERATURE AND RESULTANT THERMAL NOx.

Section II - Specific Air Contaminant Source Information

NOTE: One copy of this section should be filled out for each air contaminant source covered by this PTI application. See the line by line PTI instructions for additional information.

1. Company identification (name for air contaminant source for which you are applying): FIRE PUMP ENGINE 2

2. List all equipment that are part of this air contaminant source: FIRE PUMP ENGINE 2

3. Air Contaminant Source Installation or Modification Schedule (must be completed regardless of date of installation or modification):

   When did/will you begin to install or modify the air contaminant source? (month/year) SECOND QUARTER 2008

   When did/will you begin to operate the air contaminant source? (month/year) THIRD QUARTER 2011 **OR** after issuance of PTI ______________

4. Emissions Information: The following table requests information needed to determine the applicable requirements and the compliance status of this air contaminant source with those requirements. Suggestions for how to estimate emissions may be found in the instructions to the Emissions Activity Category (EAC) forms required with this application. If you need further assistance, contact your Ohio EPA permit representative.

   - If total potential emissions of HAPs or any Air Toxic is greater than 1 ton/yr, fill in the table for that (those) pollutant(s). For all other pollutants, if "Emissions before controls (max), lb/hr" multiplied by 24 hours/day is greater than 10 lb/day, fill in the table for that pollutant.
   - If you have no add-on control equipment, "Emissions before controls= will be the same as "Actual emissions"
   - Annual emissions should be based on operating 8760 hr/yr unless you are requesting operating restrictions to limit emissions in line # 8 or have described inherent limitations below.
   - If you use units other than lb/hr or ton/yr, specify the units used (e.g., gr/dscf, lb/ton charged, lb/MMBtu, ton/12-months).
   - Requested Allowable (ton/yr) is often equivalent to Potential to Emit (PTE) as defined in OAC rule 3745-31-01 and OAC rule 3745-77-01.

Pollutant	Emissions before controls (max) (lb/hr)	Actual emissions (lb/hr)	Actual emissions (ton/year)	Requested Allowable (lb/hr)	Requested Allowable (ton/year)
Particulate emissions (PE) (formerly particulate matter, PM)	0.27	0.27	0.07	0.27	0.07
PM_{10} (PM < 10 microns in diameter)	0.27	0.27	0.07	0.27	0.07
Sulfur dioxide (SO_2)	0.62	0.62	0.15	0.62	0.15
Nitrogen oxides (NO_x)	4.9	4.9	1.23	4.9	1.23
Carbon monoxide (CO)	1.72	1.72	0.43	1.72	0.43
Organic compounds (OC)	0.26	0.26	0.07	0.26	0.07
Volatile organic compounds (VOC)	0.26	0.26	0.07	0.26	0.07
Total HAPs	0.01	0.01	0.002	0.01	0.002
Highest single HAP: (formaldehyde)	0.002	0.002	0.0006	0.002	0.0006
Air Toxics (see instructions):	0.01	0.01	0.002	0.01	0.002

Provide your calculations as an attachment and explain how all process variables and emission factors were selected. Note the emissions factor(s) employed and document the origin. Example: AP-42, Table 4.4-3 (8/97); stack test, Method 5, 4/96; mass balance based on MSDS; etc:

Section II - Specific Air Contaminant Source Information

5. **Does this air contaminant source employ emissions control equipment?**

☐ **Yes** - fill out the applicable information below.

☒ **No** - proceed to item # 6.

Note: Pollutant abbreviations used below: Particulates = PE; Organic compounds = OC; Sulfur dioxide = SO_2; Nitrogen oxides = NOx; Carbon monoxide = CO

☐ **Cyclone/Multiclone**
Manufacturer: ____________ Year installed: ____________
What do you call this control equipment: ____________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ____________
Estimated capture efficiency (%): ________ Basis for efficiency: ____________
Design control efficiency (%): ________ Basis for efficiency: ____________
Type: ☐ Cyclone ☐ Multiclone ☐ Rotoclone ☐ Other ____________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:
____

☐ **Fabric Filter/Baghouse**
Manufacturer: ____________ Year installed: ____________
What do you call this control equipment: ____________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ____________
Estimated capture efficiency (%): ________ Basis for efficiency: ____________
Design control efficiency (%): ________ Basis for efficiency: ____________
Operating pressure drop range (inches of water): Minimum: ________ Maximum: ________
Pressure type: ☐ Negative pressure ☐ Positive pressure
Fabric cleaning mechanism: ☐ Reverse air ☐ Pulse jet ☐ Shaker ☐ Other ____________
☐ Lime injection or fabric coating agent used: Type: ________ Feed rate: ________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:
____

☐ **Wet Scrubber**
Manufacturer: ____________ Year installed: ____________
What do you call this control equipment: ____________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ____________
Estimated capture efficiency (%): ________ Basis for efficiency: ____________
Design control efficiency (%): ________ Basis for efficiency: ____________
Type: ☐ Spray chamber ☐ Packed bed ☐ Impingement ☐ Venturi ☐ Other ____________
Operating pressure drop range (inches of water): Minimum: ________ Maximum: ________
pH range for scrubbing liquid: Minimum: ________ Maximum: ________
Scrubbing liquid flow rate (gal/min): ________
Is scrubber liquid recirculated? ☐ Yes ☐ No
Water supply pressure (psig): ________ NOTE: This item for spray chambers only.
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:
____

☐ **Electrostatic Precipitator**
Manufacturer: ____________ Year installed: ____________
What do you call this control equipment: ____________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ____________
Estimated capture efficiency (%): ________ Basis for efficiency: ____________
Design control efficiency (%): ________ Basis for efficiency: ____________

Section II - Specific Air Contaminant Source Information

Type: ☐ Plate-wire ☐ Flat-plate ☐ Tubular ☐ Wet ☐ Other ___________
Number of operating fields: ___________

☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:

☐ **Concentrator**

Manufacturer: ____________________ Year installed: ____________________
What do you call this control equipment: ____________________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ____________
Estimated capture efficiency (%):________ Basis for efficiency: ____________________
Design regeneration cycle time (minutes): __________
Minimum desorption air stream temperature (^oF): ________
Rotational rate (revolutions/hour): __________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:

☐ **Catalytic Incinerator**

Manufacturer: ____________________ Year installed: ____________________
What do you call this control equipment: ____________________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ____________
Estimated capture efficiency (%):________ Basis for efficiency: ____________________
Design control efficiency (%):________ Basis for efficiency: ____________________
Minimum inlet gas temperature (^oF): __________
Combustion chamber residence time (seconds): __________
Minimum temperature difference (^oF) across catalyst during air contaminant source operation: ______
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:

☐ **Thermal Incinerator/Thermal Oxidizer**

Manufacturer: ____________________ Year installed: ____________________
What do you call this control equipment: ____________________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ____________
Estimated capture efficiency (%):________ Basis for efficiency: ____________________
Design control efficiency (%):________ Basis for efficiency: ____________________
Minimum operating temperature (^oF) and location: ____________________ (See line by line instructions.)
Combustion chamber residence time (seconds): __________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:

☐ **Flare**

Manufacturer: ____________________ Year installed: ____________________
What do you call this control equipment: ____________________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ____________
Estimated capture efficiency (%):________ Basis for efficiency: ____________________
Design control efficiency (%):________ Basis for efficiency: ____________________
Type: ☐ Enclosed ☐ Elevated (open)
Ignition device: ☐ Electric arc ☐ Pilot flame
Flame presence sensor: ☐ Yes ☐ No
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:

Section II - Specific Air Contaminant Source Information

☐ **Condenser**

Manufacturer: ______________________ Year installed: ______________________
What do you call this control equipment: ______________________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ______________
Estimated capture efficiency (%):__________ Basis for efficiency: ____________________
Design control efficiency (%):____________ Basis for efficiency: ____________________

Type: ☐ Indirect contact ☐ Direct contact
Maximum exhaust gas temperature (°F) during air contaminant source operation: ________
Coolant type: ______________________
Design coolant temperature (°F): Minimum ____________ Maximum ____________
Design coolant flow rate (gpm): ______________________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:

☐ **Carbon Absorber**

Manufacturer: ______________________ Year installed: ______________________
What do you call this control equipment: ______________________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ______________
Estimated capture efficiency (%):__________ Basis for efficiency: ____________________
Design control efficiency (%):____________ Basis for efficiency: ____________________
Type: ☐ On-site regenerative ☐ Disposable
Maximum design outlet organic compound concentration (ppmv): ______________
Carbon replacement frequency or regeneration cycle time (specify units): ______________
Maximum temperature of the carbon bed, after regeneration (including any cooling cycle): __________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:

☐ **Dry Scrubber**

Manufacturer: ______________________ Year installed: ______________________
What do you call this control equipment: ______________________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ______________
Estimated capture efficiency (%):__________ Basis for efficiency: ____________________
Design control efficiency (%):____________ Basis for efficiency: ____________________
Reagent(s) used: Type: ______________________ Injection rate(s): ______________________
Operating pressure drop range (inches of water): Minimum: __________ Maximum: __________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:

☐ **Paint booth filter**

Type: ☐ Paper ☐ Fiberglass ☐ Water curtain ☐ Other ______________________________
Design control efficiency (%):____________ Basis for efficiency: ____________________

☐ **Other**, describe ______________________________

Manufacturer: ______________________ Year installed: ______________________
What do you call this control equipment: ______________________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ______________
Estimated capture efficiency (%):__________ Basis for efficiency: ____________________

Design control efficiency (%):____________ Basis for efficiency: ____________________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel

Section II - Specific Air Contaminant Source Information

List any other air contaminant sources that are also vented to this control equipment:

6. Attach a Process or Activity Flow Diagram to this application for each air contaminant source included in the application. The diagram should indicate their relationships to one another. See the line by line PTI instructions for additional information.

7. Emissions egress point(s) information: PTIs which allow total emissions in excess of the thresholds listed below will be subject to an air quality modeling analysis. This analysis is to assure that the impact from the requested project will not exceed Ohio=s Acceptable Incremental Impacts for criteria pollutants and/or Maximum Allowable Ground Level Concentrations (MAGLC) for air toxics. Permit requests that would have unacceptable impacts can not be approved as proposed. See the line by line PTI instructions for additional information.

   Complete the tables below if the requested allowable annual emission rate for this PTI exceeds any of the following:

   - Particulate Matter (PM10): 10 tons per year
   - Sulfur Dioxide (SO2): 25 tons per year
   - Nitrogen Oxides (NOx): 25 tons per year
   - Carbon Monoxide (CO): 100 tons per year
   - Air Toxic: 1 ton per year. An air toxic is any air pollutant for which the American Council of Governmental Industrial Hygienists (ACGIH) has established a Threshold Limit Value (TLV).

   Complete Table 7-A below for each stack emissions egress point. An egress point is a point at which emissions from an air contaminant source are released into the ambient (outside) air. List each individual egress point on a separate line.

Table 7-A, Stack Egress Point Information

Company Name or ID for the Egress Point (examples: Stack A; Boiler Stack; etc.)	Type Code*	Stack Egress Point Shape and Dimensions (in)(examples: round 10 inch ID; rectangular 14 X 16 inches; etc.)	Stack Egress Point Height from the Ground (ft)	Stack Temp. at Max. Capacity (F)	Stack Flow Rate at Max. Capacity (ACFM)	Minimum Distance to the Property Line (ft)
Fire Pump 2	A	Round 6-inch ID	10	800-900	1,000	750

*Type codes for stack egress points:

A. vertical stack (unobstructed): There are no obstructions to upward flow in or on the stack such as a rain cap.
B. vertical stack (obstructed): There are obstructions to the upward flow, such as a rain cap, which prevents or inhibits the air flow in a vertical direction.
C. non-vertical stack: The stack directs the air flow in a direction which is not directly upward.

Complete Table 7-B below for each fugitive emissions egress point. List each individual egress point on a separate line. Refer to the description of the fugitive egress point type codes below the table for use in completing the type code column of the table. For air contaminant sources like roadways and storage piles, only the first 5 columns need to be completed. For an air contaminant source with multiple fugitive emissions egress points, include only the primary egress points.

Table 7-B, Fugitive Egress Point Information

Company ID for the Egress Point (examples; Garage Door B, Building C; Roof Monitor; etc.)	Type Code*	Egress Point Description (examples: garage door, 12 X 30 feet, west wall; outside gravel storage piles; etc.)	Fugitive Egress Point Height from the Ground (ft)	Minimum Distance to the Property Line (ft)	Exit Gas Temp. (F)
NA					

*Type codes for fugitive egress point:

Section II - Specific Air Contaminant Source Information

D. door or window
E. other opening in the building without a duct
F. no stack and no building enclosing the air contaminant source (e.g., roadways)

Complete Table 7-C below for each Stack Egress Point identified in Table 7-A above. In each case, use the dimensions of the largest nearby building, building segment or structure. List each individual egress point on a separate line. Use the same Company Name or ID for the Egress Point in Table 7-C that was used in Table 7-A. See the line by line PTI instructions for additional information.

Table 7-C, Egress Point Additional Information (Add rows as necessary)

Company ID or Name for the Egress Point	Building Height (ft)	Building Width (ft)	Building Length (ft)
Fire Pump 2	20	370	900

8. Request for Federally Enforceable Limits

As part of this permit application, do you wish to propose voluntary restrictions to limit emissions in order to avoid specific requirements listed below, (i.e., are you requesting federally enforceable limits to obtain synthetic minor status)?

☐ yes
☒ no
☐ not sure - please contact me if this affects me

If yes, why are you requesting federally enforceable limits? Check all that apply.

a. ☐ to avoid being a major source (see OAC rule 3745-77-01)
b. ☐ to avoid being a major MACT source (see OAC rule 3745-31-01)
c. ☐ to avoid being a major modification (see OAC rule 3745-31-01)
d. ☐ to avoid being a major stationary source (see OAC rule 3745-31-01)
e. ☐ to avoid an air dispersion modeling requirement (see Engineering Guide # 69)
f. ☐ to avoid another requirement. Describe: ____________________

If you checked a., b. or d., please attach a facility-wide potential to emit (PTE) analysis (for each pollutant) and synthetic minor strategy to this application. (See line by line instructions for definition of PTE.) If you checked c., please attach a net emission change analysis to this application.

9. If this air contaminant source utilizes any continuous emissions monitoring equipment for indicating or demonstrating compliance, complete the following table. This does not include continuous parametric monitoring systems.

Company ID for Egress Point	Type of Monitor	Applicable performance specification (40 CFR 60, Appendix B)	Pollutant(s) Monitored
NA			

10. Do you wish to permit this air contaminant source as a portable source, allowing relocation within the state in accordance with OAC rule 3745-31-03 or OAC rule 3745-31-05?

☐ yes - Note: notification requirements in rules cited above must be followed.
☒ no

11. The appropriate Emissions Activity Category (EAC) form(s) must be completed and attached for each air contaminant source. At least one complete EAC form must be submitted for each air contaminant source for the application to be considered complete. Refer to the list attached to the PTI instructions.

FOR OHIO EPA USE
FACILITY ID: ________
EU ID: ______ PTI#: ________

EMISSIONS ACTIVITY CATEGORY FORM
STATIONARY INTERNAL COMBUSTION ENGINE - FIRE PUMP 2

This form is to be completed for each stationary reciprocating or gas turbine engine. State/Federal regulations which may apply to stationary internal combustion engines are listed in the instructions. Note that there may be other regulations which apply to this emissions unit which are not included in this list.

1. Reason this form is being submitted (Check one)

   ☒ New Permit ☐ Renewal or Modification of Air Permit Number (e.g. P001) Fire Pump Engine 1

2. Maximum Operating Schedule: up to 10 hours per day; ≤ 50 days per year

   If the schedule is less than 24 hours/day or 365 days/year, what limits the schedule to less than maximum? See instructions for examples. ______Run time based on Maintenance Schedule _

3. Engine type: ☐ Gas turbine ☒ Reciprocating

4. Purpose of engine: ☒ Driving pump or compressor ☐ Driving electrical generator

5. Normal use of engine: ☒ Emergency only ☐ Non-emergency

6. Engine Manufacturer: __To Be Determined______ Model No: __To Be Determined_______

7. Engine exhaust configuration: (for turbines only)
   ☒ simple cycle *(no heat recovery)*
   ☐ regenerative cycle *(heat recovery to preheat combustion air)*
   ☐ cogeneration cycle *(heat recovered to produce steam)*
   ☐ combined cycle *(heat recovered to produce steam which drives generator)*

8. Input capacities (million BTU/hr): Rated ________ Maximum ________ Normal 2.25

   Supplemental burner (duct burner) input capacity, if equipped (million BTU/hr):

   Rated:________ Maximum ________ Normal ________

9. Output capacities (Horsepower): Rated: 325 Maximum ________ Normal 300

   (Kilowatts): Rated: ________ Maximum ________ Normal ________

   (lbs steam/hr)*: Rated: ________ Maximum ________ Normal ________

   **required for cogeneration or combined cycle units only*

10. Type of ignition: ☒ non-spark (diesel) ☐ spark

11. Type of fuel fired (check all that apply):

☐ single fuel
☐ dual fuel
☒ No. 2 oil, low-sulfur
☐ No. 2 oil, high-sulfur
☐ gasoline
☐ other, explain ______
☐ natural gas
☐ diesel
☐ landfill gas
☐ digester gas
☐ propane

12. Complete the following table for all fuels identified in question 11 that are used for the engine and any supplemental (duct) burners, if equipped:

Fuel	Heat Content (BTU/unit)	wt.% Ash	wt.% Sulfur	Fuel Usage: Estimated Maximum Per Year	Fuel Usage: Normal Per Hour	Fuel Usage: Max. Per Hour
Nat. gas	BTU/cu ft		gr/scf	cu ft	cu ft	cu ft
No. 2 oil	137,100 BTU/gal	0.01	0.05	8,050 gal	16.1 gal	16.1 gal
Gasoline	BTU/gal			gal	gal	gal
Diesel	BTU/gal			gal	gal	gal
Landfill/digester gas	BTU/cu ft		ppm	cu ft	cu ft	cu ft
Other (show units)						
List supplemental (duct) burner fuel and information below (show units):						

13. Type of combustion cycle (check all that apply):

☐ 2-stroke
☐ rich-burn
☐ carbureted
☐ other, explain ______
☒ 4-stroke
☐ lean-burn
☒ fuel injected

14. Emissions control techniques (check all that apply):

☐ prestratified charge
☐ catalytic oxidation (CO)
☐ air/fuel ratio
☐ 2-stage rich/lean combustion
☐ water/steam injection
☐ nonselective catalytic reduction (NSCR)
☐ selective catalytic reduction (SCR)
☒ injection timing retard (ITR)
☐ 2-stage lean/lean combustion
☐ preignition chamber combustion (PCC)
☒ other, explain: LOW SULFUR FUEL, TURBOCHARGING & AFTERCOOLING

For each emissions control technique checked above, explain what pollutants are controlled by each technique: LOW SULFUR FUEL REDUCES SOx BY LIMITING AVAILABLE SULFUR. TURBOCHARING AND AFTERCOOLING REDUCES CO & VOC THROUGH MORE COMPLETE COMBUSTION. INJECTION TIMING RETARD REDUCES NOX BY MOVING THE IGNITION EVENT TO LATER IN THE POWER STROKE THEREBY REDUCING THE PEAK FLAME TEMPERATURE AND RESULTANT THERMAL NOx.